

MARINE REVIEW

VOL. XIX.

Published every Thursday at
418-19 Perry-Payne Bldg.

CLEVELAND, O., JANUARY 5, 1899.

Entered at Cleveland Postoffice
as second class matter.

No. 1.

SHIP YARDS OF THE GREAT LAKES.

NOTES REGARDING NEW CONTRACTS—TO MAKE A STEAMER OF THE AURANIA—
ENLARGED MACHINE SHOP AT CHICAGO.

With some sixteen steel vessels of different types, most of them large freight carriers, now under way, the lake ship builders, with the exception of the Detroit Dry Dock Co., have enough new work in hand to keep them busy until some time after the opening of navigation next spring. "We have an abundance of repair work in hand," says one of the officers of the Detroit company, "and we are determined not to take a contract for a new ship until we find more profit in it than is warranted by the prices accepted of late for new work. We might have had two vessels lately if we were willing to accept figures even a little higher than those at which the contracts were closed. There will be work enough to go around." It is understood that the Detroit company has assurance of a contract for one freight steamer, and probably two, from Detroit parties for whom they have already built vessels, and this is why they have upheld prices in cases where they have been called upon to meet general competition. They have the steel barge Aurania of Cleveland at their yard awaiting repairs, and it is quite probable that she will be equipped with triple expansion engines and Scotch boilers at an expense of about \$50,000. If this is done, John Corrigan of Cleveland will have a 5000-ton steamer at a total cost of \$150,000. The Aurania was a cheap vessel when built and has proven a very large carrier. The Detroit yard has about all that it can care for until spring in the repair line, as the list of extensive jobs additional to the Aurania includes the steamers Fayette Brown, Selwyn Eddy, City of Rome, Presley and S. R. Edwards. At the Dry Dock company's Wyandotte yard the two small steel vessels that have been under way for some time past are well along towards the launching stage. These are the small side-wheel steamer that is to engage in passenger service between Erie and Buffalo and the tug building for the use of government engineers engaged in surveys and river and harbor work on Puget sound.

The Chicago Ship Building Co., Globe Iron Works Co. and Detroit Dry Dock Co. are all understood to be figuring on the large side-wheel steamer that is to be built by C. F. Bielman and others of Detroit for the Detroit-Port Huron service. Although the Detroit owners of steamers on this river service are spending about \$30,000 in rebuilding the engines of the wrecked Greyhound, they are determined upon another side-wheel steamer, which is not to be ready for service, however, until the spring of 1900. She will be a three-decker of very large dimensions, with great capacity for excursionists. Engines are to be of the inclined triple expansion type.

The Chicago Ship Building Co. has begun the purchase of a large number of tools for the extensive addition that is to be made at once to its engine plant. At an expense of about \$30,000 (including tools) an addition of 80 feet is to be made to the Chicago shop, which is already one of the finest of its kind in the country. In machinery lines the Chicago company has not been depending upon the marine trade, but has been doing all manner of heavy work for Chicago firms.

The contract for the Western Transit Co.'s new package freight steamer, placed a few days ago with the Union Dry Dock Co. of Buffalo, calls for a steel vessel 402½ feet long over all, 52 feet beam and 28 feet moulded depth, to carry 5,700 net tons on 17½ feet of water, in addition to 100 tons of fuel, with a guaranteed speed of 13 miles an hour loaded.

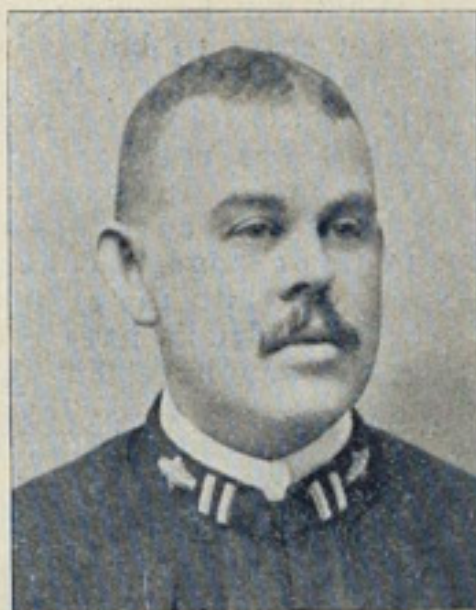
RECEIVER FOR ATLANTIC TRANSPORTATION CO.

Owners of lake vessels under charter to the Atlantic Transportation Co. of New York seem to feel no particular uneasiness over the announcement from New York that receivers have been appointed for the property of that concern. It has been the practice to make payments of charter rentals monthly in advance, and the owners received this week the checks for January. The fact that these checks were signed by the Chesapeake & Ohio Coal Co., the principal company with which the Atlantic company has contracted for the transportation of coal, indicates close relations between these two concerns and close relations also with the C. & O. Ry. Co. The receivers appointed are Edward P. Meaney, president of the Atlantic Transportation Co., and M. E. Ingalls, jr., of the Chesapeake & Ohio Coal Co. According to a New York despatch the liabilities of the concern are \$975,000 and the assets about \$615,500, but these are admittedly unofficial figures. Officials of the Cleveland bank through which all checks are paid incline to the opinion that the application for receivers was made simply to facilitate certain difficulties in the administration of the property. W. A. Hawgood, a Cleveland vessel owner, has gone to New York to investigate. There is little doubt that if the lake vessels are not retained by the Atlantic Transportation Co. other profitable occupation will be found for them, at least for the steamers and the better class of barges, as it is generally understood that vessels of this kind are wanted on the coast. The task of bringing all the barges back to the lakes would, of course, be a difficult and expensive one.

Railway Age statistics of new railroad building in the United States in 1898 show 3,018 miles, as against 1,880 miles in 1897; 1,848 miles in 1896; 1,803 miles in 1895; 1,949 miles in 1894; 2,635 miles in 1893, and 4,192 miles in 1892.

RETIREMENT OF W. M. MCFARLAND.

There will be no one in the country, who during the past few years has had anything to do with the bureau of steam engineering of the navy department who will not regret to learn of the retirement from active service in the navy of Chief Engineer Walter M. McFarland, even while rejoicing in the recognition of his merit which comes in his selection to a most important and highly responsible position in the industrial world. Mr. McFarland, who has but recently been promoted to the rank of chief engineer, resigns as one of the youngest officers in recent years who has attained that grade. His resignation is to take effect six months hence, but meanwhile he is granted six months leave of absence. Mr. McFarland leaves the navy to become assistant general manager of the Westinghouse Co. at Pittsburg at a salary four times as large as that which he receives from the government. He was appointed to the naval academy in 1875 as a cadet engineer, as a result of a competition among the public schools of the District of Columbia, and at Annapolis he easily took first place in his class. While attached to the engineering bureau of the navy department he had much to do with designing the machinery for the vessels of the modern navy which have rendered such good accounts of themselves. Mr. McFarland, although essentially a specialist, exemplified at the same time the theory that a man who can do one thing well can do several things well, for despite his multitudinous duties as first lieutenant in the service of Engineer-in-Chief Melville, he found time until recently to compile the Journal of the American Society of Naval Engineers and did much to bring that journal to its present high place among technical publications. As secretary of the society mentioned, he displayed the same energy and capacity for unremitting hard work that distinguished his service in the navy, and he is also one of the moving spirits in the Society of Naval Architects and Marine Engineers. His earnest, unceasing efforts in behalf of the naval personnel bill are well known. He was a member of the Roosevelt board of personnel, and his clear insight into all phases of the question and general good judgment contributed materially to a solution of the problem. Personally there was no more popular officer in the navy.



Editor of the Review:—I notice in your last issue, Dec. 29, your statement of the substance of the proposed shipping bill, Hanna-Payne measure. As you do not comment much upon it, would it not be well to examine its provisions a little closer and compare it with the bill prepared just a year ago, which you will find published in the New York Commercial of Jan. 3, 1898. That bill is far preferable for the real good of the country. The Commercial illustrates that in condemnation, partly because it would draw an immense sum from the treasury, not giving it credit for what it contributes from its own and foreign sources. The present measure will draw direct, without contributing anything, a sum which will compare with the pension list. Later on I will endeavor to give you some points on this score.

VIEWS OF A BATH SHIP BUILDER.

Editor of the Review:—I notice in your last issue, Dec. 29, your statement of the substance of the proposed shipping bill, Hanna-Payne measure. As you do not comment much upon it, would it not be well to examine its provisions a little closer and compare it with the bill prepared just a year ago, which you will find published in the New York Commercial of Jan. 3, 1898. That bill is far preferable for the real good of the country. The Commercial illustrates that in condemnation, partly because it would draw an immense sum from the treasury, not giving it credit for what it contributes from its own and foreign sources. The present measure will draw direct, without contributing anything, a sum which will compare with the pension list. Later on I will endeavor to give you some points on this score.

WM. ROGERS.

Bath, Me., Jan. 2, 1899.

HARLAN & HOLLINGSWORTH REORGANIZATION.

At a recent meeting of the board of directors of the Harlan & Hollingsworth Co., Wilmington, Del., to fill the vacancy in the office of president, caused by the death of the late J. Taylor Gause, Mr. H. T. Gause was elected president, Mr. H. W. Gause vice president and secretary and Mr. J. Rodney Gause to the vacant directorship. The above, with Mr. S. K. Smith, treasurer, and Mr. T. Jackson Shaw, superintending engineer, completes the board of directors. The following changes have also been made in the organization of the plant: Mr. W. F. Carnes, assistant superintending engineer; Mr. E. B. Sadler, superintendent of hull construction; Mr. J. Rodney Gause, assistant superintendent of hull construction; Mr. Thomas Benson, superintendent of dock and repairs.

Although it was decided, two or three weeks ago, to put off the annual meeting of the Lake Carriers' Association until March 22, the executive committee of the association held another meeting in Cleveland, Tuesday, and changed the date to Tuesday, January 24. There was considerable dissatisfaction on account of the proposition to delay the meeting until March. The meeting will be held at the Russell House, Detroit, where provision will be made for a suitable assembly room and also for rooms in which to hold committee meetings.

A number of the officers of vessels caught in the ice jam at Colchester, Lake Erie, last month, a few days since presented a handsome silver water service to Capt. Matthew Mulholland of the steamer Alva, in recognition of the service which he rendered in going ashore on the ice when the fleet was imprisoned, in order to summon aid.

Capt. Charles W. Black, who last season sailed the steamer Simon Langell, died suddenly of lung trouble at the home of his sister in Port Huron last week.

INSURANCE MATTERS AT BUFFALO.

OFFICES OF SMITH, DAVIS & CO. AND JOHNSON & HIGGINS TO BE UNITED—
PLANNING FOR ANOTHER YEAR'S BUSINESS—THE CANAL BOATMEN.

Buffalo, Jan. 4.—The announcement to be made this week of the absorbing of the Buffalo office of Johnson & Higgins by Smith, Davis & Co. will be an item of importance in lake marine circles, though in fact it is nothing new, for negotiations to that end were on foot last winter and possibly still longer ago. The retirement from the position of attorney of the firm by F. P. Gordon hastened the negotiations, and those who knew what was going on knew that a bargain was soon to be struck when James B. Dickson of the New York firm came to Buffalo last week. It is given out that the entire office and outfit of Johnson & Higgins in this city will be given up, and Mr. Shriver, the new attorney, will return to the home office in New York. What will become of the clerical force, which is now quite large, does not seem to be known, though some of them will be needed for the management of the fire business, which comes with the rest. In this the firm is following regular methods, holding its own companies, though it was nothing but a firm of brokers in marine matters here as in New York. It appears to be accepted that Smith, Davis & Co. will again assume an important position as regards lake insurance on account of this change, and likely new marine companies will either be added or brought into the alliance. Still, this is only a matter of conjecture as yet, as no details have been given out regarding the two firms, further than the announcement that their relations are to be much closer than during the past year. There will be a meeting of the Inland Lloyds before long, after which the policy of the Buffalo office for another year will probably be given out.

It really looks as though the canal boatmen were going to succeed with their present effort to patch up the tatters of the old law providing for a general deepening of the Erie canal. It has been a hard task, for there were so many people ready to say that they would never make another effort to improve the canal on any lines whatever, but it is felt that the state is now in better hands than for a long time and the boatmen are insisting that the work was begun wrong end first before. They declare that if they had been consulted, as they should have been, the enlargement of the locks would have been completed now, and the boats of the new system, large enough to carry about 20,000 bushels of wheat, could be built at once. As it is now, nothing can be done till the work on the locks is assured. One thing that the boatmen stick to with all their old-time tenacity is the determination that no corporation shall be allowed to operate the canal. They insist that individuality is to be the policy just as it always has been. The boatmen's bill, which has received long and careful study, will be ready for the legislature very soon after it gets down to work.

NEW RED "D" LINER.

It is announced that the Harlan & Hollingsworth Co. of Wilmington, Del., has closed a contract to build for the Red "D" line of New York City a modern steel twin-screw steamer. The vessel will be 277 feet 6 inches over all, 266 feet inside of stem to the inside of the rudder post, 37 feet moulded beam, 18 feet 6 inches moulded depth, and 19 feet 4 inches depth at center. The vessel will be of 1,300 tons burden. She will be equipped with two sets of triple expansion, surface condensing engines, with cylinders of 14, 22 and 36 inches diameter and a stroke of 24 inches. Steam will be supplied from two Scotch boilers, 12 feet 9 inches in diameter by 12 feet in length, at a working pressure of 160 pounds. The main deckhouse will be of steel, with the interior finished in hard woods and the stairways of oak. On top of this will be placed the upper deckhouse, which will also be of steel. Accommodations will be provided for first and second-class passengers, the house for the latter being on the after deck. The social hall will be finished in maple. There will be two steel pole masts and five cargo booms. The equipment will include four Williamson hoisting engines and a steam steering gear of that company's make. Fire alarms will be placed in each hold with indicators of improved pattern, to give the proper location of a fire. The propellers will be of solid manganese bronze, and a repeating engine room telegraph system will be installed throughout. An effort will be made to secure the completion of the vessel within a few months, as the line is much in need of her. This contract makes the twelfth closed by the Harlan & Hollingsworth Co. during the year 1898.

HEAVY INSURANCE LOSSES.

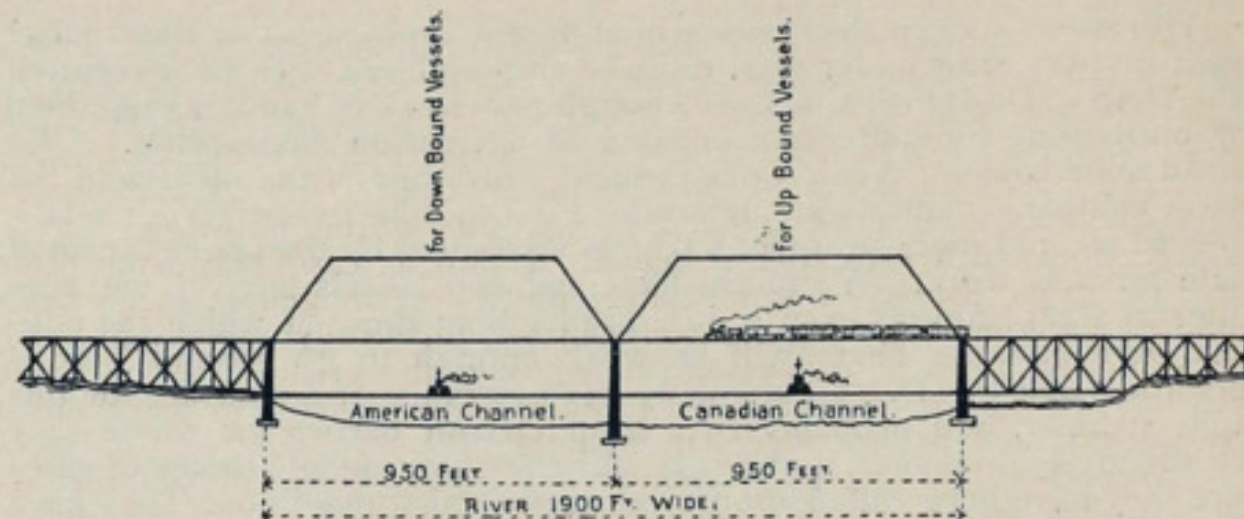
As a more careful computation of the losses of the past year is made it is demonstrated conclusively that the season of 1898 was a pretty disastrous one for the underwriters holding risks on either great lakes or ocean going tonnage. At the same time it is evident that the underwriters are desirous of presenting the worst possible aspect of the case, with a view to facilitating an effort to raise rates next season. Figures regarding losses on seagoing vessels are now coming to hand. It was, of course, the numerous heavy losses which brought up the total, such as the La Bourgogne, which was valued at \$800,000 and her cargo at \$500,000, while the Mohegan had a valuation of \$700,000 and her cargo \$150,000. A summary of twenty-six of the more important losses of the year gives an aggregate valuation of vessels at \$4,325,000 and their cargoes at \$7,397,500. Insurance men say that it has been a number of years since the severity of the losses was equalled.

A towing machine to be furnished by the American Ship Windlass Co. of Providence, R. I., to the big steel barge of about 8,000 net tons capacity building at Chicago for the Minnesota Steamship Co., will be the heaviest device of its kind ever built. This machine will weigh 28,000 pounds. The American Ship Windlass Co. has of late received a large number of orders from the British government for capstans to be used in connection with numerous docks under control of the admiralty. Only a few days ago they received a cable order from Russia for twenty-five hand-power capstans and for fifteen dock steam capstans to go to Siberia, to be used in connection with the government railway of that country.

DETROIT RIVER BRIDGE QUESTION.

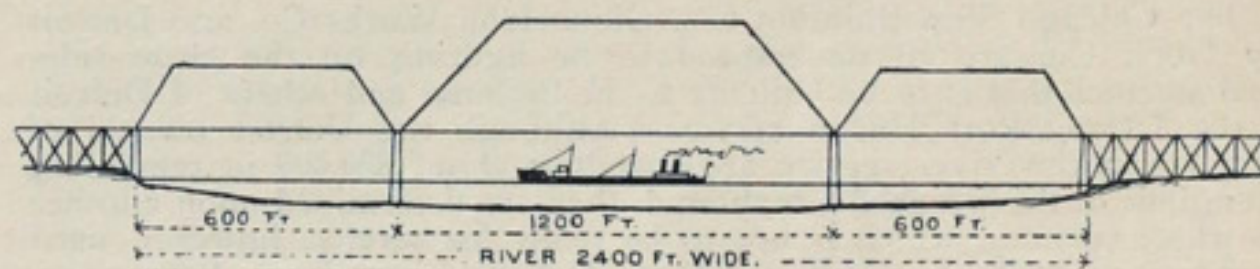
Editor Marine Review:—The Michigan Central has again introduced in congress a bill asking the privilege of bridging the river at Detroit anywhere "between the northeasterly city limits and 2½ miles below the southwesterly city limits." This bill, if passed, will grant the Detroit River Bridge Co., which is a Michigan Central corporation, the right to build a bridge across the Detroit river at any point they choose to do so within the limits provided in the bill. This will grant the Michigan Central the privilege of placing their bridge where their former bill located it, namely, in the center of the harbor abreast of the city of Detroit.

The Detroit River Bridge Co.'s bill provides for crossing the river in three continuous spans, with two piers in the harbor, where vessels are passing up and down continually, ferries crossing and recrossing, to say nothing of the ships lying at anchor, and the great timber rafts which are constantly towed through this river during the season of navigation.



Would it not be extremely hazardous for the navigation interests to permit two piers to be placed in the midst of this moving mass of steamers, sailing vessels, etc., especially so when the lights of the city are most confusing to the mariner at night. It would seem that a bridge could be more conveniently located in regard to the vessel traffic than one directly opposite the city.

The river near Fort Wayne is only 1950 feet wide and could be crossed easily in two spans, with but one central pier in the river. Vessel traffic is only up and down the river at that point, and such a bridge would make navigation more safe, by dividing the up-bound from the down-bound vessels. It is possible that the river could be crossed in a single span at this its narrowest point. The Forth bridge in Scotland was compelled to be built with a span of 1710 feet, and the shipping at that point is not one-



tenth the importance of that passing through the Detroit river. A bridge in this locality could be used just as conveniently by the railroads as one opposite the city.

I enclose sketches showing where the Michigan Central bridge would possibly be located and also what a bridge down the river at its narrowest point, near Fort Wayne, might be. It would seem that as the United States government annually appropriates millions of dollars to free the channels and waters of the great lakes from obstructions and dangers to navigation, that a bridge, which is undoubtedly a public necessity, at Detroit, should be built having the least possible number of piers in the river.

Detroit, Jan. 2, 1899.

SCHOOL FOR THE MERCHANT MARINE.

Thomas E. Heenan, United States consul at Odessa, in a communication recently forwarded to the state department at Washington, outlines the plan of a school established, not long ago, at Odessa by the Russian government for the purpose of training the young men of the country in the theory and practice of navigation, in order that they may become competent to take command as masters and mates on Russian merchant vessels. The consul strongly recommends the establishment of similar institutions throughout the United States, pointing out that those who successfully pass the course in the Russian school are familiar with the English, French and German languages, physics, mathematics, theoretical mechanics, commerce, political economy, book keeping, physical geography, nautical astronomy, ship building, commercial geography, law, hygiene, etc.

The revenue for the support of the institution at Odessa consists of sums appropriated by the government for its maintenance, annual subsidies from the municipality out of the sums received from the tax levied on exports, subsidies from steam navigation and other companies, and payments by students for their instruction. During the course of education, in addition to theoretical teaching, practical instruction is given on vessels. For instruction in special subjects the charge is \$75 per annum, and for general educational subjects \$37.50 per annum for a weekly lesson. After students have passed in the theoretical course of instruction, they must take a course in practical navigation for about three months in vessels of the merchant navy, and for about two months in the training ship of the classes.

The treasury department, bureau of navigation, has just issued its thirtieth annual list of merchant vessels of the United States and vessels of the navy for the year ending June 30, 1898.

The Russian government has placed an order for ten torpedo boat destroyers for the Pacific squadron, to be completed within two years.

ERIE CANAL PROBLEM.

NEW YORK'S COMMERCIAL SUPREMACY IS DEPENDENT UPON IMPROVEMENT OF THE STATE WATERWAYS—VIEWS OF MAJOR T. W. SYMONS.

Hearings of the state commerce commission, recently appointed in New York, are bringing out some valuable opinions regarding the problem of Erie canal improvements. It is hoped that the new administration in New York will be strong enough to straighten out the canal problem, on account of its important bearing on the commercial supremacy of New York, a subject to which the state commission is giving special attention. Major Thomas W. Symons of the United States engineer corps, who has for some time past been in charge of harbor improvements at Buffalo and at other points on Lakes Erie and Ontario, has given a great deal of study to the question of Erie canal improvements. A report which he made not long ago to the war department, advocating an enlarged Erie canal for barge purposes, as against the several deep ship canal schemes from the lakes to the Atlantic, deals with the subject from a commercial point of view in a very able and practical manner. Major Symons has now given to the New York commission his views based on the present situation of demoralized canal improvement work. He says:

"Under existing circumstances and conditions the highest commercial interests of New York demand, in my opinion, the following:

"First—In order to realize benefits within a reasonably short time, the Erie canal should be immediately improved, in general accordance with present plans, to the greatest degree financially and physically attainable, so as to allow passage to boats of the greatest possible size, with locks arranged to permit the passage of these boats in pairs and in the quickest and most convenient manner.

"Second—That ample, convenient and cheap terminal facilities devoted exclusively to canal traffic should be supplied and maintained at Buffalo and New York.

"Third—That all restrictive legislation upon the use of the canal be annulled, and encouragement given to all responsible transportation companies by affording them terminal sites upon nominal terms and for sufficient length of time to justify them in improving the same. This would enable transportation companies to form through freight lines by vessels on the lakes and boats on the canal to carry produce and merchandise on through bills of lading between upper lake ports and New York, which has never been possible and accounts far more for declining business than any physical defects of the canal. In other words, so amend the laws that business can be conducted on the canal in connection with lake lines, in the same manner that business is now conducted on lake and rail lines.

"New York's commercial supremacy was largely built up by the Erie canal; her relative decadence is coincident with the decadence of the Erie canal, and she can regain what she has lost and maintain her relative supremacy, and with business transacted upon it in accordance with modern methods, as exemplified in the great railroad lines. The great railroads of America give to several seaports practically equal transportation facilities, and combinations among railroads can be effected favorably to other ports at the expense of New York. With the Erie canal in its present antiquated condition this is still possible, as the canal in its existing condition and under existing systems of operation, cannot compete with the railroads. If, however, the canal and business methods under which it is operated were improved in the manner indicated, it would furnish an independent highway for the public use, which could provide transportation at lower rates than the railroads could, which highway would lead to New York City, and the railroads would have to compete as best they could with the canal.

"It is my opinion that, under existing circumstances and prospects, the work undertaken by the state in improving the Erie canal should be continued until the full result aimed at is accomplished. Such a canal would permit the transportation of freight through it at a reduction of fully 40 per cent. below the cost attainable by the present canal, and transportation rates by the canal could then be low enough to secure business, and a large amount of business would undoubtedly be done, provided always that business is done on modern lines, as hereinbefore mentioned."

About every week of late a despatch from West Bay City, Mich., announces that the opening of the Wheeler ship yard at that place will take place "in a few days." It is generally understood that Mr. F. W. Wheeler has been quite successful in his arrangements with bondholders, with representatives of the Bessemer Steamship Co. and with others holding claims against the ship yard or the last three vessels built for the Bessemer company, but this is not all that is necessary to open the ship yard. It may be that the Bessemer company will enter into some arrangement for the construction of another vessel or two, but even this is doubtful, and otherwise there is not much prospect of steel ships being built by anyone at West Bay City in the future. With the tendency toward closer margins in ship building on the lakes, the different yards must have repair work, in order to keep up an organization of working men and to realize a profit. A ship yard at West Bay City has no use for a dry dock, gets no repair work, and therefore can not succeed. If there is any idle capital for ship building lying around, a better place to invest it would be at Ashtabula, where there is demand for a dry dock and for a large amount of repairs, as well as a share of the new work.

The Newport News Shipbuilding & Dry Dock Co. has received the contract to overhaul the steamer New York of the American line. Officials at the ship yard state that it is impossible to fix a date for the laying of the keels of the battleship Missouri and the monitor Arkansas. The keels for the two Cromwell liners and the fourth new Morgan liner will not be laid until the three Morgan liners now on the ways are launched. The tug for the Morgan line will be launched within the next few weeks.

William Rogers, pioneer ship builder of Bath, Me., who, by the way, is president of the Bath Board of Trade, is naturally quite proud of his record in building one barge in his yard every two months during 1898.

C. P. HUNTINGTON ON THE SHIPPING BILL.

Mr. Collis P. Huntington, principal stockholder in the Newport News Ship Building & Dry Dock Co., and who is also at the head of extensive steamship interests on the Pacific, is thus quoted regarding the Hanna-Payne shipping bill:

"The bill is in the interest of American commerce. Anything that tends to give financial and moral support to the merchant marine is beneficial. As soon as the people of this country feel assured that the government is to treat their marine interests as the other commercial nations of the world do theirs, they will have the courage to build ships to handle the large commerce this country has been doing for many years in foreign bottoms. The great tonnage that has thus been used has given an army of foreign laborers work. Because of our sending our products in foreign ships other nations have been giving a vast amount of work to their laboring people in creating these ships, and it has been a corresponding detriment to the people of the country which has not built them. There is no doubt that the skill and adaptability of our workmen in doing things where they have anything like an equal chance will be almost sure to succeed.

"It will not conflict with the ship building interests of the country, but on the contrary, will serve them, as ships under the American flag will have to be built by American ship builders, and that will necessarily bring about the employment of a very large number of workmen who need the wages. Of all the things manufactured in this country it is doubtful whether there is any one product which represents so much proportionately in actual labor as a ship. The mere cost of the material that goes into a great ship—the iron in the mine, the coal in its bed, and the timber in the forest before it is distributed by the hand of man—is insignificantly small, and the cost of incorporating it into the completed structure of a ship is paid to labor. So that probably the cost of the labor involved in building a ship and fitting it with its requisite machinery represents ninety-five per cent of the actual value of the ship, and all this goes to the wage-workers of the country."

When asked whether the bill gave sufficient assistance to the steamship interests of the United States, Mr. Huntington remarked: "It gives something to the steamship interests, and as nothing was given before the bill is certainly a benefit to those interests. I do not think that it would have any effect whatever upon the present mail subsidy law. We propose to build two large steamships for the Pacific Mail Co. They will be of 10,000 tons capacity, and are what the company has needed for a long time to accommodate its increasing business."

THE NEW BOSTON DRY DOCK.

Advertisements have been issued for the construction of the granite and stone dry dock at the Boston navy yard, Charlestown, Mass., and bids will be opened at the bureau of docks, navy department, Washington, on Jan. 31. This new dock, which will be the largest and best equipped in the United States, if not in the world, was provided for in the last naval appropriation act. The appropriation is \$1,025,000. The same act provided for the construction of three other dry docks of wood, at a cost not to exceed \$825,000 each, at Mare island, Cal., Portsmouth, N. H., and League island (Philadelphia). The civil engineer corps of the navy department has been engaged for four months in the preparation of plans for the Boston dock. The contract will of course be awarded to the lowest responsible bidder, without the manifestation of any preference for New England contractors. The new dock will be constructed adjoining the stone dock, in which the monitor Amphitrite has been lately undergoing repairs.

AWARD OF PRIZE MONEY.

Various circumstances have combined to hamper Frank Morris, navy auditor of the United States treasury department, in his final settlement of the prize money cases growing out of the recent war. Only two cases, those of the St. Paul and the Eagle, have been finally closed up, and it may be months before any others are disposed of. The latter illustrates forcibly how little many "prize" cases really amount to. The Eagle captured the Spanish schooner Dolores, and although the court found that the schooner and her cargo were worth \$1,271, there was left after the costs were paid only \$859.02, which will have to be divided between Lieutenant Southerland, her commander, and a crew of sixty. The commander's share will not be over \$40 or \$50, and some of the crew will receive only \$3 or \$4. Thus far 1,580 claims have been filed with the navy auditor by men who participated in the war.

BEGIN SAVING YOUR REVIEWS.

In the year now opening the ship yards of the country will probably turn out more new steel vessels than in any three years of the past. Descriptions of these vessels, with illustrations of working drawings and photographs, will be a feature of the Review. Every effort will be made to keep fully in touch with all that is going on in the way of improvements and new designs. If for no other purpose, this ship building information referred to repeatedly throughout the year, would be sufficient to warrant subscribers in keeping files of their papers. The Review furnishes a neat, cloth-board binder, which will be sent by mail, prepaid, at \$1. It is provided with means by which the papers, inserted each week, may be held as in a bound book. One binder may be made serviceable for several years, as the successive volumes may be bound up when completed in a permanent form at slight cost. The Marine Review Pub. Co., 418-19 Perry-Payne building, Cleveland.

Manager Newcomb of the Manhattan Steamship Co., of which one of the Hillmans of Philadelphia is president, says the company will not be affected by the failure of the Hillman Ship & Engine Building Co. The Manhattan company is the concern which chartered or purchased several lake vessels.

Preston Brearley, for the past twenty years master ship builder for the Neafie & Levy Ship & Engine Building Co. of Philadelphia, died a few days ago as the result of injuries received in a collision with a bicyclist.

STORMS OF 1898 ON THE GREAT LAKES.

[BY ALFRED J. HENRY, CHIEF OF DIVISION, WEATHER BUREAU.]

The season of navigation that ended on December 21, 1898, was in some respects a notable one. The previous winter had been mild and open, and the ice in the straits breaking up much sooner than usual made it possible to begin inter-lake navigation as early as April 1. Notwithstanding the early opening of navigation and the liability thus incurred of exposure to stormy weather, during the forepart of April, no severe storms were experienced either in that or the following month of May. The summer months are, as a rule, free from severe storms and the past summer was not an exception to the general rule. Beginning with the latter part of October, however, stormy weather began and continued intermittently until about the close of the season.

The severity of a storm is determined by several conditions, so that it is not always possible to compare one storm with another, or, taking a more complex case, the storms of one season with those of another. The simplest case of storm is that commonly known as a "northwester." It is simple and uncomplicated because the wind, after having shifted to the northwest will remain comparatively steady in that quarter and the weather, if it did not begin to clear with the shift to the northwest, will soon do so. Very high winds may accompany a northwester, but if the weather is comparatively clear little damage will be done to shipping interests. When, however, the wind is variable and the seeing is bad, whether due to rain, fog, or snow, the danger of navigation is much increased and the longer such conditions continue the greater is the need of extreme caution.

The severest storm of the season, that of Nov. 21-22, took an unusual course, viz., almost due north from northwestern Illinois to the center of Lake Superior, where it diminished greatly in force and gradually passed away. In the meantime, however, two fine steamers had been cast on the rocky shores of Lake Superior, the Orr and the Tampa, again illustrating the power of wind and water over even the staunchest steamer. This storm did not extend to the lakes east of Michigan, except possibly the northern part of Huron, where southeasterly winds of about 32 miles per hour were experienced. The severest storm, reckoning from a financial point of view, was the one that culminated on Oct. 26 with northerly gales over the upper lakes. The winds were not unusually high, the greatest velocity reported being 36 miles per hour from the north at Alpena. The weather, however, was quite heavy, snow and rain, mixed, falling the greater part of the 26th.

The storm of Nov. 10 caused northerly and northeasterly gales over lower Lakes Michigan and Huron and Lakes Erie and Ontario. Hitherto the lower lakes had escaped the full severity of storms that were disastrous in other parts of the lake region. The storm of Nov. 25 and 26, which wrought such terrible destruction on the New England coast, also left its impress in the lake region, where moderately high winds, combined with a heavy fall of snow, were responsible for several costly wrecks.

As above stated, it is difficult to compare the storms of one year with those of another. Generally speaking, however, the storms of last season were much like those of 1893, both as to number and severity. In that year a West Indian hurricane advanced into the lake region, and numerous other storms from a westerly quarter were experienced. A very severe storm swept over the lake region in May, 1894, and there was a large number of severe storms in 1895, to be followed by two years of comparative immunity from storms.

SHORTAGE IN VESSEL CAPACITY.

OUTPUT OF THE SHIP YARDS WILL NOT EQUAL THE LOSSES DUE TO STORMS AND TO THE TRANSFER OF LAKE VESSELS TO ATLANTIC COAST SERVICE.—SOME INTERESTING FIGURES.

A summary of the carrying capacity of vessels lost on the lakes during the past season permits of some figures being presented that are of interest in considering the matter of lake freights for another year. The freight vessels that are total losses in the sense that they will no longer compete for lake trade had a combined capacity for a single trip of 46,670 net tons; add to this 73,500 net tons, which is the capacity of some forty-five vessels chartered to the Atlantic and Manhattan companies of New York for coast service, and we have a total of 120,170 net tons capacity removed from the lakes. As against this loss there are twelve large freight carriers, eight of them steamers, building in lake yards, and their combined capacity for a single trip is 75,300 tons. Some of these new vessels will not be ready for service until July, but when they are in commission they will, of course, make a greater number of trips in a given period than vessels of the older type. Still it is evident that for the coming season, at least, the loss of vessel capacity due to storms and to charters for coast service is not to be made up by the work of the ship yards.

Several efforts have been made to show the losses on hulls and cargoes from all causes—partial as well as total losses—during the season of 1898. Estimates of this kind have been in nearly all cases wide of the mark, on account of the refusal of underwriters to give up figures regarding the large number of heavy losses on steel vessels due to strandings in the rivers and in shoal places generally throughout the lake region. It is probable that the losses from all sources, including lost cargoes, low grade vessels on which there was no insurance, and the numerous items paid on account of strandings, stress of weather, etc., would exceed \$3,000,000. But this is only an estimate, while the figures presented herewith regarding vessels that have actually passed out of existence are accurate. Following is such a summary for five years past:

LOSSES ON THE GREAT LAKES (VESSELS THAT ACTUALLY PASSED OUT OF EXISTENCE) DURING THE PAST FIVE YEARS.

	Number of vessels.	Capacity, net tons.	Approximate value.
1898.....	64	46,670	\$1,203,200
1897.....	35	21,450	372,900
1896.....	35	21,435	386,500
1895.....	63	48,975	1,290,100
1894.....	54	31,415	522,750

It will be noted that the total losses of the present season—sixty-four vessels of 46,670 net tons' capacity, valued at \$1,203,200—are after all somewhat below the losses of 1895; but this year the underwriters have

suffered heavily in losses on such vessels as the J. H. Outhwaite, H. A. Barr, Tampa, Aberdeen, Arthur Orr, City of Rome, George Presley, G. B. Owen and other wrecks, which do not appear in the list of total losses, but on which large sums must be paid for wrecking work and still larger items in repair bills. The season was remarkable for its freedom from collisions, and from heavy storms during the early spring and until September, but the mild weather of the summer months was followed by a continuous blow during October, November and December. Following is the list of total losses:

TOTAL LOSSES ON THE GREAT LAKES DURING 1898—SHIPS THAT ACTUALLY PASSED OUT OF EXISTENCE.

Name of Vessel.	Date.	Type of Vessel.	Cause.	Where.	Capacity net Tons.	Approximate Value.
City of Duluth.....	Jan. 26	Stmr.	Stranded.	Lake Michigan	1,450	\$30,000
Northwest.....	April 6	Schr.	Foundered	traits.	2,300	28,000
Maine.....	" 15	Stmr.	Burned.	Tonawanda.	500	15,000
Glad Tidings.....	" 20	Schr.	Stranded.	Hamm'nd's Bay	350	1,000
Servia.....	" 28	Stmr.	Burned.	Whitefish Point	2,200	70,000
Arnold, J. Gnes.....	June 1	Tug.	Burned.	Green Bay.	.....	3,000
American.....	" 14	Schr.	Burned.	St. Clair, Mich.	450	2,500
Goodman, R. F.....	Aug. 10	Tug.	Burned.	Lake Superior.	.....	3,000
Superior.....	" 29	Stmr.	Foundered	Lake Michigan	1,050	23,000
Winslow, Richard.....	Sept. 8	Schr.	Foundered	Lake Michigan	1,000	14,000
Forester.....	" 10	Schr.	Stranded.	Lake Huron.	100	500
Mediator.....	" 18	Schr.	Stranded.	Lake Superior.	550	2,000
Colorado.....	" 18	Stmr.	Stranded.	Eagle Harbor.	1,700	20,000
Queen of Lakes.....	" 18	Stmr.	Burned.	South Manitou.	.....	5,000
Active.....	" 18	Schr.	Stranded.	Lake Michigan	50	300
Keepsake.....	" 18	Schr.	Foundered	Off Ashtabula.	600	2,000
Jones, J. H.....	" 19	Tug.	Collision.	Georgian Bay.	.....	14,000
Southwest.....	" 19	Schr.	Stranded.	Huron Island.	600	4,500
Keystone.....	" 19	Stmr.	Burned.	Green Bay.	950	17,000
Preston, Maud.....	" 20	Stmr.	Burned.	Toledo.	250	4,500
Smith, Ira O.....	" 22	Tug.	Burned.	Lake Michigan	.....	3,000
Monitor.....	" 25	Lighter	Foundered	Sault river.	.....	2,500
Toledo.....	" 29	Stmr.	Stranded.	Portage.	600	12,000
Rogers, A. J.....	Oct. 9	Schr.	Stranded.	Lake Michigan	700	4,500
Leo.....	" 12	Tug.	Stranded.	Milwaukee.	.....	2,500
Shepard, L. B.....	" 13	Schr.	Stranded.	Lake Michigan	450	3,500
Churchill.....	" 14	Schr.	Foundered	Waukegan.	1,500	43,000
Nassau.....	" 14	Schr.	Collision.	Bar Point.	450	4,500
Jewett.....	" 17	Schr.	Stranded.	Hamm'nd's Bay	400	1,800
Chisholm, Henry.....	" 20	Stmr.	Stranded.	Isle Royale.	2,100	70,000
Bavaria.....	" 23	Schr.	Stranded.	Georgian Bay.	600	4,500
Hector.....	" 23	Schr.	Stranded.	Lake Ontario.	700	4,000
Dall, Annie.....	" 24	Schr.	Stranded.	Lake Michigan	250	2,500
Blake, Edward.....	" 24	Schr.	Burned.	Lake Huron.	550	4,000
Rebel.....	" 24	Tug.	Foundered	Lake Superior.	.....	2,500
Wenona.....	" 24	Schr.	Stranded.	Portage.	550	5,000
Steele, George.....	" 26	Schr.	Stranded.	Tawas.	600	2,500
Doty, L. R.....	" 26	Stmr.	Foundered	Lake Michigan	2,650	100,000
Barbarian.....	" 26	Schr.	Stranded.	Milwaukee.	600	1,500
Minch, C. P.....	" 26	Schr.	Stranded.	Georgian Bay.	750	8,000
Gould, E. F.....	" 26	Stmr.	Stranded.	Oscoda.	450	5,000
Tuttle, H. A.....	" 26	Stmr.	Stranded.	Lake Michigan	.....	65,000
St. Peter.....	" 26	Schr.	Foundered	Lake Ontario.	600	4,500
Harrison, C.....	" 31	Schr.	Stranded.	Lake Michigan	250	100
Capron, M.....	Nov. 1	Schr.	Stranded.	Bailey's Harbor	275	1,200
Pacific.....	" 3	Stmr.	Burned.	Collingwood.	700	32,000
Northern Belle.....	" 6	Stmr.	Burned.	Ontario.	450	15,000
Minnehaha.....	" 7	Schr.	Stranded.	Sheboygan.	100	400
Austin, D. S.....	" 7	Schr.	Stranded.	Ludington.	550	4,000
Thal, S.....	" 8	Schr.	Foundered	Lake Michigan	100	300
West, N. C.....	" 9	Schr.	Collision.	St. Clair river.	250	1,000
Fassett, T. S.....	" 10	Schr.	Stranded.	Sand Beach.	950	9,000
Whaleback 104.....	" 10	Barge.	Stranded.	Cleveland.	2,600	70,000
Nielson, L. M.....	" 10	Schr.	Stranded.	Lake Michigan	150	2,500
Corona.....	" 18	Stmr.	Burned.	Tonawanda.	500	16,000
Vision.....	" 18	Stmr.	Burned.	Tonawanda.	100	5,000
St. Lawrence.....	" 26	Stmr.	Stranded.	Lake Michigan	1,850	70,000
Sibley, H. W.....	" 26	Stmr.	Stranded.	Lake Michigan	2,100	75,000
Harlem.....	" 26	Stmr.	Stranded.	Isle Royale.	3,000	165,000
Aurora.....	Dec. 6	Stmr.	Burned.	Detroit river.	3,200	90,000
McClellan, G. B.....	" 15	Tug.	Burned.	Michigan City.	.....	2,500
Swain, M.....	" 17	Tug.	Burned.	Sault river.	.....	12,000
Moore, T. M.....	" 22	Tug.	Burned.	Niagara river.	.....	2,500
Joys.....	" 23	Stmr.	Burned.	Sturgeon Bay.	350	14,000
Totals.....					46,670	\$1,203,200

FOG ON THE GREAT LAKES DURING 1898.

[BY NORMAN B. CONGER, MARINE AGENT, WEATHER BUREAU.]

During the season of navigation in 1898 (April 1 to Dec. 15) fog was observed the greatest number of days, 60 out of 259, in the region east of Keweenaw point.

During the month of April fog was confined mostly to the lower lakes and over the eastern end of Superior, the greatest number of reports being received from Lake Erie, although there was a large number of reports received from the Thunder bay region of Lake Huron. Very few reports were received from Ontario.

In May heavy fog belts were observed on all the lakes, and with about equal frequency, except as regards Ontario. On Lake Huron the most fog was reported from Thunder Bay, north to the straits, and on Michigan over the southern half of the lake.

During June fog was reported continuously over Superior; on Michigan and Huron it was generally confined to the northern portion, while Erie and Ontario had but little.

In July fog was confined almost entirely to Lake Superior, the region about Keweenaw point and eastward to Whitefish having the most. Three reports of fog were received from northern Lake Michigan and one from the northern portion of Huron. No reports were received from Erie or Ontario.

During August heavy fog banks prevailed over Lake Superior and over northern Lakes Michigan and Huron, with scattering banks on the western end of Erie. It would appear that the fog conditions began to work southward during this month.

During September fog continued on Superior, but was lighter and generally covered the eastern portion. Heavy banks were observed on Michigan, Huron, and Erie, but none on Ontario.

In October there was a general distribution of fog on all the lakes, but it was much lighter over Superior than on the lower lakes. Southern Lake Michigan had but very little.

The reports for November show light banks of fog over extreme

western Superior, over Green Bay on Lake Michigan, and on Huron from Thunder bay southward to the St. Clair river; on Erie over the extreme western portion. But few reports were received from Ontario.

Taking the season as a whole, the reports of fog indicate that the heaviest banks and the localities where they are most likely to be encountered are: On Superior, from Whitefish point westward to Keweenaw point on Michigan, in midlake, from off Waukegan to the straits, and over northern lake Huron. The fog distribution on Lakes Erie and Ontario is not uniform, and fog is not so frequent as on the upper lakes. The maximum number of days on which fog was reported on the several lakes is as follows: Superior, 60; Michigan, 24; Huron, 38; Erie, 13; Ontario, 8; on the St. Marys river, 28; St. Clair and Detroit rivers, 16.

Two important points have been established by the investigation of fog during the present season: First, that fog reports from shore stations can not be depended upon to establish fog conditions of the lakes, since fog was reported continuously on the lakes, while very little appeared at land stations; second, that the wind direction appears to have but little influence upon the formation of fog, especially on the upper lakes, and that the appearance of fog is due to changes of air and water temperatures, especially those that tend to produce a strong contrast between the temperature of the air and the water. In confirmation of this point, it may be stated that fog appears most frequently on Lake Superior, some distance from shore, where the water temperatures are low and the difference between air and water temperatures is the greatest. This is especially true of the region eastward of Keweenaw point, where water temperatures as low as 39.5° have been observed during July and August.

In beginning the investigation of fog distribution on the great lakes, it was anticipated that fog would be encountered frequently on Superior from Whitefish point westward to Keweenaw and to a less extent as far west as the Apostle islands. It was also anticipated that the regions of greatest fog on Michigan would be found in midlake, and on Huron from Saginaw bay northward to the straits and Detour. On Lakes Erie and Ontario no definite fog distribution was anticipated, as these lakes are under different influences relative to currents and temperatures. The fog reports of this season appear to bear out these conclusions to a marked degree. It is too early in the investigation to make definite statements other than are laid down on the weather bureau chart, but there is sufficient material to indicate that important results will follow from the continuance of the work. Too much praise can not be given to the vessel masters who have faithfully taken the observations during the season and thus made an investigation of this question possible. It is hoped that all masters will cheerfully give their assistance during the entire season of 1899.

ELECTIONS AMONG SHIP MASTERS AND MARINE ENGINEERS.

At the annual meeting of the Cleveland lodge of the Shipmasters' Association the following officers were elected: President, Capt. Carlton Graves; first vice president, Capt. Claud M. Ennes; second vice president, Capt. John Smith; financial secretary, Capt. W. W. Brown; recording secretary, Capt. William Carlross; treasurer, Capt. Thos. Jones; delegate to grand lodge, Capt. Carlton Graves; alternate, Capt. Henry Stone.

Toledo branch of the Ship Masters Association has elected the following officers for the ensuing year: President, Capt. William J. Leaver; first vice president, Capt. James McKinley; second vice president, George W. Burtis.

Officers elected by the Marine Engineers' Beneficial association of Toledo for the year 1899 are: Past president, Burton Ransom; president, Alpha Page; vice president, John Marshall; recording secretary, James L. Aznoe; corresponding and financial secretary, E. D. Locke; treasurer, F. N. Weise; conductor, Samuel Shantan; chaplain, Jay A. Popp; door keeper, Richard Skeldon; delegates to the national convention, E. D. Locke and James L. Aznoe.

At a recent meeting of Marine Engineers' Beneficial association, No. 44, of Manistee, Mich., Wm. R. Patterson was returned to the presidency. H. F. Otto was chosen vice president; Chris Dahl, corresponding secretary; Richard Winkler, treasurer; Roy Marsh, recording secretary; E. R. Winkel, financial secretary; Charles Fleming, chaplain; Frank McMillan, conductor; Harry Grotemat, door keeper.

At the annual meeting of the Milwaukee lodge, Ship Masters' Association, the following officers were elected for the ensuing year: President, Daniel Sullivan; first vice president, C. E. Moody; second vice president, Fred Schwerman; treasurer, F. C. Starke; secretary, John McSweeney. Daniel Sullivan was chosen delegate to the grand lodge meeting, with E. B. Marquette, alternate.

FAILURE OF THE HILLMAN CO.

An announcement that caused considerable surprise in shipping circles was that of the assignment last week of the Hillman Ship & Engine Building Co. of Philadelphia to J. Warren Coulston. The exact cause of the failure seems difficult of determination. It is stated from some sources that it was due to a desire to settle the estate of the late Charles Hillman, who until his death last week was president of the company. According to other reports it was induced by losses sustained by the company in connection with the construction of the torpedo boat Mackenzie. This boat when recently completed was overdue more than a year, and according to the terms of contract a penalty of \$50 per day was to be exacted in the event of the non-fulfilment of contract. The vessel has not yet been accepted by the government. Almost the only work in the yard at the present time consists of several tugs for the Staples Coal Co. of Taunton, Mass., and a dredge for a gold mining company. The Hillman company was incorporated in March, 1891, with a paid in capital of \$150,000. The company built the Clyde line steamer Yemasee, the Red D liner Maricaibo, the Pennsylvania railroad ferry boats St. Louis and New Brunswick, and other craft.

Present indications are that the bids of both the Maryland Steel Co. of Sparrows Point, Md., and Bradbury & Co. of New York for the construction of a dry dock at Algiers, La., will be rejected, and either congress asked for a larger appropriation, in order to provide a better dock, or new bids called for.

REPORT FROM DEEP WATERWAY ENGINEERS.

The United States board of engineers on deep waterways, consisting of Major Raymond of the army engineer corps, Philadelphia, George Y. Wisner of Detroit, and Alfred Noble of Chicago, has just made a report to congress through the secretary of war. This is the board that has been engaged for a long time past on surveys for a deep waterway from the great lakes to the Atlantic seaboard. No recommendations or estimates are submitted. The report is simply one of progress. A small appropriation is asked to continue the surveys.

The report states that the work executed under the direction of the board has been confined to the following specific investigation: The control of the level of Lake Erie; the projected Niagara ship-canal; the Oswego-Oneida-Mohawk route; the St. Lawrence-Champlain route. A measurement of the discharge from Lake Erie was made and a determination of the slopes in the Niagara river secured. Two routes were surveyed for the purpose of locating a ship-canal around Niagara Falls, one leaving the Niagara river at Tonawanda, N. Y., passing a short distance west of Lockport and reaching Lake Ontario at Olcott, the other leaving the Niagara river at La Salle, five miles below Tonawanda, and entering the Niagara river near Lewiston, below the falls and rapids. These surveys were completed between terminals above named, with the exception of diamond drill borings which are still in progress at lock sites. These borings will probably be completed in two months. In order to complete the surveys between deep water in Lake Erie and deep water in Lake Ontario, small surveys will have to be made at the mouth of the Niagara river and at Olcott harbor.

The Oswego-Oneida-Mohawk route is the designation given to that portion of the proposed waterway embraced between deep water in Lake Ontario in front of Oswego, N. Y., and the mouth of the Mohawk river at West Troy, N. Y. The survey of this line has been completed with the exception of a small number of borings in the Oswego river and explorations with the diamond drill at sites of locks and dams. A small amount of work remains to be done near the eastern terminus of the route. It is expected that the field work will be completed within three months.

The St. Lawrence-Champlain route, connecting deep water in the St. Lawrence river below the outlet of Lake Ontario with deep water in the Hudson below Albany, was also surveyed with the exception of a few miles in the vicinity of Massena, N. Y., and certain sections in Lake St. Francis and Lake Champlain and borings in the Hudson river below Albany. This work probably will be completed in two months.

NOTES IN GENERAL.

The United States government has purchased the steamer Clearwater of the Macheca line for \$150,000.

Rear Admiral Francis M. Bunce, commandant of the New York navy yard, was retired on the age limit this week.

A large and attractive calendar, issued by the Insurance Company of North America, has reached the Review from George L. McCurdy, marine agent, Chicago.

The Review is in receipt of a neat catalogue from Horace See, No. 1 Broadway, New York, illustrating the See specialties—indicators, ash ejectors, grease extractors, electric recorders, etc.

A picture of the icebreaking steamer Ermack, reproduced in a recent issue of the Review, was from the Engineer of London, instead of from another publication as stated at that time.

The Variety Iron Works of Cleveland has secured another contract for the metal work of a new light house—the West Bank light, New York lower bay. The job amounts to about \$13,000.

The Bangor Steamship Co. of Bangor, Me., announces that the new steamer which it will build, and which will be similar to the City of Bangor, but 13 feet longer, will be ready for service early in 1900.

The American Steam Packing Co. of Boston has stepped aside from the general rule of large calendars and has issued one of vest pocket size on celluloid. It is designed to call especial attention to the asbestos metallic packing manufactured by this firm.

J. W. Duntley, president of the Chicago Pneumatic Tool Co., writes from London to the effect that the growth of the company's business in England is more than satisfactory. Mr. Duntley is about to make a trip through France, Belgium and Germany.

In its interesting and attractive circular entitled "Draft Without a Chimney" the B. F. Sturtevant Co. of Boston tells why its tall chimney has been taken down, how draft is now produced, and how an annual fuel saving of nearly \$1,000 is secured. This information may be had for the asking.

Boilers for the new western line steamer, to be built by the Union Dry Dock Co. of Buffalo, will be furnished by the Lake Erie Boiler Works of Buffalo. They will be of Scotch type, 12½ feet diameter by 12 feet length, and built to withstand 210 pounds pressure. The vessel is not to be delivered until August next.

When the former lake steamer John J. Hill was hauled out at Burnham's marine railway at Boston, last week, it was found that although the vessel had been high and dry on the Wollaston beach for nearly three weeks, she had sustained comparatively slight injury. After her machinery has been overhauled, she will proceed to Hillsboro, N. B.

The Baldt Anchor Co. of Chester, Pa., has just issued a very attractive little pamphlet filled from cover to cover with the pleasant things which vessel owners on the great lakes and the coasts are constantly saying about the Baldt patent stockless anchor. The testimonials are well selected and they prove conclusively the justice of many of the claims made by the Baldt company.

It is now stated that the announcement that the Chesapeake & Ohio railroad will build a new steamer to replace the Louise on the route between Newport News and Norfolk was premature. It is also announced that the Louise will be overhauled, and that in all probability the work will be done at the ship yard of the W. R. Trigg Co. at Richmond, this being the first merchant work undertaken by that firm.

MARINE REVIEW

Devoted to the Merchant Marine, the Navy, Ship Building, and Kindred Interests.

Published every Thursday at No. 418-19 Perry-Payne building, Cleveland, Ohio, by THE MARINE REVIEW PUBLISHING CO.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, \$1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

The Marine Review will issue next week its annual Ship Building Edition. The character of this edition, which deals with ship building throughout the United States, and which this year will be extensively circulated in European ship building districts is well known to most of our readers. Present indications are that the number to be issued next week will be larger than any of its predecessors and more elaborately illustrated. The fact that previous special editions of the Review have almost invariably been exhausted soon after publication prompts the suggestion that subscribers desiring extra copies will perhaps further their interests by placing orders early. The price will remain as usual. We may say for the benefit of prospective advertisers that forms will be kept open until next Tuesday, Jan. 10.

The magnitude of iron and steel production in the United States during 1898 is a matter of great surprise, even to the closest students of the industry, and yet the output of the year just begun is certain to establish new records about which there are no predictions, on account of the fear that estimates now looked upon as quite reasonable would be entirely too low. The rapidly-developing export trade in steel rails, ship plate and other important lines is one great feature of uncertainty. There is no telling what proportions this trade may reach before the new year is at an end. Exact figures regarding the production of pig iron during 1898 are not yet at hand, but from the monthly reports of active blast furnace capacity, published by the iron trade journals, it is quite certain that the exact total for the past year will exceed 11,500,000 gross tons, as compared with 9,652,680 tons in 1897 and 8,623,127 tons in 1896. This leaves so far behind the records of any competing iron manufacturing country that our pre-eminence for generations is thoroughly assured.

The United States civil service commission announces two important examinations to take place at any city in the United States where it has a board of examiners. On Feb. 7 an examination will be held for the position of assistant inspector of hull material, bureau of construction and repair of the navy department, for duty at the Allen Wood Co., Conshohocken, Pa., at a salary of \$5 per day. On March 7 an examination will be held for the position of assistant draughtsman, especially qualified in designing electrical machinery of war vessels, for service at Newport News, at a salary of \$4 per day. Persons desiring to compete for either positions should at once write to the United States civil service commission, Washington, D. C., for copies of the manual of examination and application blanks.

From all producing and distributing centers of the iron and steel industry comes the story of the continued extraordinary activity, with an advancing tendency in prices. In fact, powerful interests are doing their utmost to keep the rise in check, fearing that it will galvanize into life many schemes for putting crippled plants on crutches and starting new ventures with the enormous development of speculative interest in iron companies. Money is only too likely to flow into the industry, not counting the funds which are coming into the hands of parties who have spent a lifetime in the trade, and who have just sold out and are about to sell out to the great consolidations. A large part of that money is likely to go back into some branch of the industry.—Iron Age.

There is some cause for gratification on the part of naval officials since it has been announced that the war department has at last discovered that extortionate prices have been charged for repair work on its transports and will hereafter be guided by estimates which the navy department will make on such work.

Rumor has it that the report of the conclusions of the court of inquiry, appointed to fix the responsibility for the striking of the battleship Massachusetts recently in New York harbor, and which has been submitted to the navy department, attaches no blame to the commander of the ship.

A recommendation to Secretary of the Navy Long for the appointment of a number of additional civil engineers in the navy will be made by Captain Endicott, chief of the bureau of yards and docks. If granted it is probable that a competitive examination will be held at Washington.

The navy department has issued orders for the discharge of the one hundred volunteer engineers now in the navy. It is proposed to appoint a number of these officers as steel inspectors and carry them on the list of civilian employees if authority can be secured.

Major Clinton B. Sears, United States engineer at Duluth, advertises elsewhere in this issue for bids for dredging in Portage Lake ship-canals and for building substructure for the new north pier at Duluth. Both are extensive jobs.

OUR NAVIGATION LAWS.

(From Lieut. Kelley's book, "The Question of Ships").

Somewhat curtailed, the navigation laws may be summarized as follows: No American is allowed to import a foreign-built vessel in the sense of purchasing, acquiring a registry, or using her as his property; the only other imports, equally and forcibly prohibited, being counterfeit money and obscene goods. An American vessel ceases to be such if owned in the smallest degree by a naturalized citizen, who may, after acquiring the purchase, reside for more than one year in his native country, or for more than two years in any other foreign state. An American ship owned in part or in full by an American citizen who, without the expectation of relinquishing his citizenship, resides in any foreign country, except as United States consul, or as agent or partner in an exclusively American mercantile house, loses its register and its right to protection.

A citizen obtaining a register for an American vessel must make oath that no foreigner is directly or indirectly interested in the profits thereof, whether as commander, officer or owner. Foreign capital may build our railroads, work our mines, insure our property and buy our bonds, but a single dollar invested in American ships so taints as to render it unworthy of the benefit of our laws. No foreign built vessel can, under penalty of confiscation, enter our ports and then sail to another domestic port with any new cargo, or with any part of an original cargo which has once been unladen previously, without touching at some port of some foreign country. This law is construed to include all direct traffic between the Atlantic and Pacific ports of the United States via Cape Horn, the Cape of Good Hope, or the Isthmus of Panama; and, being a coasting trade, foreigners cannot compete. An American vessel once sold or transferred to a foreigner can never again become American property, even if the transaction has been the result of capture and condemnation by a foreign power in time of war. Vessels under 30 tons cannot be used to import anything at any seaboard town. Cargoes from the eastward of the Cape of Good Hope are subject to a duty of 10 per cent. in addition to the direct importation duties. American vessels repaired in foreign ports must pay a duty on the repairs equal to one-half the cost of the foreign work or material, or pay 50 per cent. ad valorem, the master or owner making entry of such repairs as imports.

This liberal provision, which dates from 1866, is made to include boats obtained at sea from a passing foreign vessel in order to assure the safety of our own seamen. No part of the proper equipment of a foreign vessel is liable to duty, except it be considered redundant; thus when two sets of chains were found upon such a vessel, one was made chargeable with duty. Foreign vessels arriving here in distress, with loss of equipment, must pay duties on the articles imported for repair; if they need sheathing, 45 per cent. is exacted for the new copper used, and 4 per cent. for the old copper removed. In one case a foreign vessel left her mooring chains of foreign manufacture on an American wharf, and with great alacrity duties were immediately and lawfully collected on them as importations. If a citizen buys a vessel of foreign build stranded on our coast, takes her into port, repairs and renders her serviceable, she cannot become American property unless the repairs amount to 75 per cent. of the whole value of the vessel. Except in the fisheries, all our vessels engaged in foreign trade must pay annually a tax of 30 cents a ton—a ship of 1,000 tons, for instance, contributing \$300, which represents the profit and interest of \$5,000 at 6 per cent.

Vessels belonging to foreign states having commercial treaties with us pay the same tonnage dues; but if an alien becomes an owner, even to a fractional amount, in an American ship, not only does the latter lose her registry, but the foreign privilege is void, and the joint ownership is charged with a tax of 60 cents a ton. If a picnic party comes into an American port in a foreign vessel, on the great lakes, for example, in a Canadian steamboat, such vessel becomes liable to a tonnage tax. Though the act of 1872 makes free all material necessary for the construction of ships in this country for foreign trade, such vessels cannot engage in domestic trade for more than two months in any one year without payment of the duties, for which a rebate was allowed.

Canal boats crossing the Hudson river, or any other navigable stream, are making a coasting voyage, and must be enrolled and licensed as coasters; in default of such precautions they have been seized, and released only after much delay and upon the payment of a fine. A foreign private yacht, touching at different parts of our lake or seacoast, and carrying passengers—members of other hospitable clubs—can be punished for violating the laws of domestic trade.

We have practically given the maritime peoples of the world the power to compete freely with free ships for a trade we deny our own merchants. Under this dispensation, our seaboard cities have become stations where foreigners may loot our producers; and we survey, buoy and police our harbors mainly for foreign guests, and our grand lighthouse system holds out to burn so that these sinners against our greatness may return to us, unregenerated, unrepentant and voracious for more of our material benefits.

The passenger department of the Plant system has just issued a little booklet which will probably be as thoroughly appreciated by a considerable portion of Americans interested in either trade or travel as anything that has appeared in many a day. The little volume is entitled "What to Say in Spanish and How to Say It," and it is designed to meet all the needs of visitors to our new possessions who are unfamiliar with the language. There are bills of fare, as well as complete formulas of all the phrases which would be employed under ordinary circumstances at the theatre, in hotels, churches, barber shops, bar rooms, post offices, railway stations, etc. There are even lists of hotels and a copy of a Havana laundry slip. Copies of this very valuable little handbook will be sent free upon application to the New York office of the Plant steamship and Railway system.

At a recent dock trial the engines of the battleship Kearsarge, building by the Newport News Ship Building & Dry Dock Co., ran smoothly and the boilers supplied all the steam that could be utilized,

NAVAL ENGINEERS.

OBSTACLES SAID TO HAVE BEEN PLACED IN THEIR WAY AT SANTIAGO—
ANOTHER CHAPTER IN THE STRUGGLE BETWEEN DECK AND
ENGINE-ROOM FORCES.

The achievements of the engine room forces of United States naval vessels during the recent war have combined with the agitation of the naval personnel bill, now before congress, to direct considerable attention to the men who have made creditable records down in the holds of the vessels, where the temperature often ranges from 136 to 200 degrees. As might be expected from the importance of their service, the naval engineers and their work constitute a subject that has been very exhaustively treated from every imaginable standpoint by the technical and newspaper press. Some of the statements have provoked replies, and apparently the discussion has only just begun. One treatise on the subject which has provoked as lively a discussion as any, and which is likely to afford the foundation for a still more animated controversy later, is the paper "The Fighting Engineers at Santiago," contributed to the current number of the Engineering Magazine by Arthur Warren. Mr. Warren has been a newspaper and magazine writer for some years and from 1888 to 1896 acted as the London correspondent of a Boston paper. In his present contribution he says, in part:

"How was it that the correspondents at Santiago omitted to mention a fact no less important than this—that on that Sunday morning when the Spanish fleet broke out from the harbor at Santiago the American fleet was unprepared to make a quick movement of any kind in the face of the enemy? Admirals and captains are brave enough and keen tacticians, no doubt, but the best part of the Spanish fleet would have slipped through somebody's fingers that Sunday morning at Santiago if America's fighting engineers had not, by the hardest of work, overcome the obstacles imposed upon them by orders from the bridge. For engines were uncoupled, and many fires out, and steam so low that all the energy of the stokers was required to get it up again.

"The American ships had been off the coast for weeks, waiting for the enemy to come out. When the enemy came out, the American ships were ready to shoot, but not to give chase. This was no fault of the engineers. It was not the effect of over-confidence. It was the result of a condition. The condition is peculiar to naval practice. It was long ago discarded in the merchant service. In the merchant service a chief engineer controls his department. In the navy the captain controls the engineers, and is in turn controlled by the commanding officer of the fleet. The chief engineer of an Atlantic liner looks to the captain for starting and stopping signals only; for the rest he takes his orders from his owners and reports to them. The chief engineer alone is responsible for the care, operation and economy of the machinery. In the navy the ship's captain decides how many boilers shall be used, how much coal shall be burned, what pressure shall be carried. And the American captains at Santiago had everything in readiness, except their boilers and engines. There were two exceptions—the Oregon and the Gloucester. What the Oregon did other American ships could do with similar men. The Oregon's record is a tribute to the fighting engineers. It is a tribute to the good sense of the commanding officer who permitted his chief engineer to control the engines.

"Every ship in the United States service is supposed by the regulations to have a forced draft test twice a year. Only the commander of the ship can order it. But some of the ships have never made a forced draft run since their trial trips. Perhaps the captains do not believe in it. At any rate, their men have not been trained to use it in emergency. The lay mind might suppose that the object of sending the fleet to Santiago was to have it ready to jump at the enemy at the sound of the general alarm. There is a touch of the farcial in building warships, equipping them with powerful machinery, to be able at the instant of battle to get out of them only a fraction of their power. But somebody in authority reasoned in the fashion of Gilbertian topsy-turvydom. So the American fleet waited for the Spaniards with engines uncoupled, boilers filled (as they had long been) with salt water when they were not empty, and half the grates as clean as whistles and as cold as ice boxes. 'We were caught unprepared,' said one of the United States engineers, 'low fires in three boilers, others empty, and furnaces not charged.'

"Then there was the Brooklyn. When there was no enemy anywhere about—on the way from Hampton Roads to Santiago—the flagship of the Flying Squadron had all her engines and four of her boilers in use. When she went on the blockade at Santiago and had the enemy in touch, she had only half her engine power and half her boiler power ready for use. Admiral Schley turned his ship to starboard, swung to the south and ran seaward before taking up a parallel course with the retreating Spaniards. He had steam only in three boilers; of his remaining boilers some had water, others were empty. The interesting manoeuvres of the Brooklyn will be none the less interesting if it is found, on investigation, that standing orders from the bridge to the engine room had deprived the ship of so much of her power that she had to turn on her heel and keep at a respectful distance from the Spaniard. After the general alarm was sounded there was nothing for it but to fill the Brooklyn's empty boilers with sea water. Then the fires had to be laid and started. Just before the Colon surrendered—that is, just at the end of the battle—all of the Brooklyn's boilers were steaming at the maximum pressure. But the forward engines were uncoupled still. There was no time to stop or slow up.

"A generation hence the anomalies of the present service will have passed away. The line officer of the future will know the engine room as well as the wheel house and the bridge, for he will serve below as well as above. Meanwhile nothing will be lost if we remember what the fighting engineers did to save the day at Santiago."

Mr. Warren's article is highly interesting by reason of the fact that he demonstrates in every part of it the possession of private inside information of a seemingly most accurate character. Moreover, it will be remembered that on none of these points has the public been enlightened by the reports of Admiral Sampson or the other officers of the fleet.

One of the most vigorous replies which the Warren article has

called forth is that of Capt. F. E. Chadwick of the New York, which has been published with the indorsement of Admiral Sampson. After taking the writer of the magazine article to task for alleged inaccuracies in distances and the running time of vessels, the commander of the flagship says: "The writer indulges in various other inaccuracies as to cold furnaces, etc. The New York and the Brooklyn have four engines, all of which together can only be used to advantage with full power. The New York was using forty-five tons of coal a day on the blockade, as it was. It was the practice to keep steam on four of the six boilers, a fifth filled with water kept hot by the hydrokineter and primed ready for firing, and a sixth cleaning. This was the condition the day of the action. The sixth boiler, as were all the rest, was filled with fresh, not salt, water. To have kept fires sufficient to use efficiently all the engines coupled would have occasioned an expenditure of coal which would have forced the New York from her station, as it did others. As it was, she was hanging on by her eyelids, so to speak, avoiding as long as possible going to Guantanamo. The use of her and the Brooklyn's engines coupled before the moment of full power would have been a serious detriment, and after full power was on it would have been absurd to have stopped to couple when going 16 or 17 knots, and thus lose from four to five miles, when it was so clearly apparent that the chase was being rapidly overhauled. Stringent orders existed regarding the use of fresh water in all ships; it was not singular to the Oregon. The New York never had any but fresh water in her boilers, in spite of the writer's general assertion to the contrary, and a circular order of Admiral Sampson of May 29 covered this matter in great detail. If full steam had been kept at all times, as the writer seems to think from the newspaper reports it should have been, it would simply have meant more ships off their stations and less force to meet the enemy. It would have been a foolish thing to do from any point of view, particularly from the engineering, as bleeding continuously into the condensers at a high pressure would have been most injurious to them, and we should have had our ships shortly altogether hors de combat."

Apropos of the discussion of the naval engineers it may not be amiss to note the tribute paid by Rudyard Kipling, who recently returned from a visit to the British Channel squadron. The greatest living master of English says: "They are an amazing breed, these quiet, rather pale men, in whose hands lie the strength and power of the ship. 'Just think what they've got to stand up to,' says Twenty-one, with the beautiful justice of youth. 'Of course, they're trained at Keyham and all that, but fancy doing your work with an eight-inch steam-pipe in the nape of your neck, an' a dynamo buzzin' up your back, an' the whole blessed shoot whizzin' round in the pit of your stomach! Then we jump about an' curse if they don't give us enough steam. I swear I think they're no end good men in the engine room!' If you doubt this, descend by the slippery steel ladders into the bluish copper-smelling haze of hurrying mechanism all crowded under the protective deck; crawl along the greasy footplates, and stand with your back against the lengthwise bulkhead that separates the desperately whirling twin engines. Wait under the low-browed supporting columns till the roar and the quiver has soaked into ever nerve of you; till your knees loosen and your heart begins to pump. Feel the floors lift below you to the jar and batter of the defrauded propeller as it draws out of its element. Try now to read the dizzying gauge-needles or find a meaning in the rumbled signals from the bridge. Creep into the stokehold—a boiler blistering either ear as you stoop—and taste what tinned air is like for a while. Face the intolerable white glare of the opened furnace doors; get into a bunker and see how they pass coal along and up and down; stand for five minutes with slice and 'devil' to such labor as a stoker endures for four hours."

RECOGNITION FOR AMERICAN TOOLS.

Evidence of the manner in which American ship building tools have been gaining a foothold in British ship yards is contained in the note of alarm that attends the comments of the trade press of the United Kingdom. In a recent issue of the Engineer of London occurs the following: "The English manufacturer is at length beginning to recognize that automatic machine tools are of great importance. There can be no question that the automatic tools and automatic devices applied to machine tools have come as a permanency. The automatic tool has arrived at such a state of perfection that no longer need any hesitation be felt in adopting it. American engineers do not stand still, and they have eagerly learned by experience. The consequence is that their tools are as stoutly built as our own, and are as well finished; and in accessibility of their working parts, in ingenious automatic devices, in adaptation for rapid work, in convenience and handiness they are far ahead of the productions of most British firms. There is but one other point to which we must in conclusion call attention, because it struck us forcibly at recent exhibitions; that is the continual improvement in the American tools and the appearance of new designs. It shows how keenly alive the Americans are to everything which may give them the advantage, and how strong the rivalry between the different makers continues to be, and it is one of the points that the English maker, less ready in invention, will have the greatest difficulty in combating."

The National Association of Manufacturers has just issued an American Trade Index, being a descriptive and classified directory of manufacturers engaged in export trade. It is designed for foreign circulation and is pretty certain to be of immense benefit to the firms whose names are included. The book constitutes one feature of the practical work being done by the National Association of Manufacturers in the extension of the foreign trade of the country.

The Army and Navy Journal states that Secretary Long will approve the findings of the court in the case of Naval Constructor Hanscom, tried at League island for neglect of duty in not reporting the fact that civilian employes of the construction department had been paid for work not performed, but will remit that part of the sentence which provides for a suspension of six months. Mr. Hanscom will be ordered to the Cramp yard.

FAST TRANSATLANTIC TRIPS.

So far as the fast transatlantic passages are concerned, 1898 was not a notable year in the steamship world. The Kaiser Wilhelm der Grosse still holds, undisputed the record voyage both eastward and westward. She has made in a single nautical day 580 miles, and her average for twenty-six voyages is 21.37 knots, which is unparalleled. The best single trips of the leading liners for the year were: The Cunarder Lucania, 157.3 hours; White Star liner Teutonic, 168.8 hours; American liner St. Louis, 166.3 hours; North German Lloyd liner Kaiser Wilhelm der Grosse, 151.3 hours; Hamburg-American liner Fuerst Bismarck, 171.7 hours, and the French liner La Touraine, 187.3 hours. These figures go clearly to illustrate the great progress made in steam vessels since the first voyage of that class of craft in 1819, when it required twenty-two days to cross the Atlantic, says the New York Commercial. Since that day the time of passage has been cut down, almost hour by hour. The steamship Sirius, of 320 horse-power, which was operated in 1838 by the first Atlantic steamship company, the British & American Steam Navigation Co., made the run between London and New York in seventeen days. The Sirius has always been regarded as the "pioneer" Atlantic liner, and it was she that inaugurated the "ocean records." Her voyage in 1838 was marveled at, and she received the title of "Queen of the Seas," which every first-class Atlantic company has since struggled to earn for its crack boat.

After the Sirius came the Great Western, owned by the Great Western Steamship Co., and built expressly for the Atlantic trade. She was of 800 horse-power, with a coal carrying capacity of 600 tons. The Great Western eclipsed the Sirius entirely, making the run from Bristol to New York in 15 days, 10 hours. Half the town's population, it is said, were assembled at the Battery when she arrived, and her reception was most cordial. But the following year, 1839, a new vessel was launched, called the British Queen, which crossed from London to New York in 14 days, 6 hours. The Great Western, however, not to be outdone, took on a spurt one day and reclaimed the laurels by making the run in 12 days, 14½ hours.

In 1840, when the Cunard company came in the field with the Britannia, Acadia, Caledonia and Columbia, the rivalry became quite keen. The Britannia was pitted against the Great Western and robbed her of all her glory. The Great Western company then put on the Great Britain, regarded as a marvel of shipwright's craft in her day. She vanquished all rivals by steaming across the big pond in 12½ days. Things ran along this way down until 1852, when the Collins liner Baltic startled both continents by making the trip in 9 days, 13 hours. The Atlantis, the Asia and the Africa made almost equally speedy trips about the same period.

Until 1857 no better voyage than the Baltic's was made. The Cunard line then brought over the Persia, which steamship outclassed anything afloat. Her time was 9 days, 10 hours, 30 minutes. The same year the American steamship Vanderbilt entered the contest, winning out with a record of 9 days, 8 hours. In the following year the Great Eastern crossed the Atlantic, covering a distance of 3,188 miles in about 10 days. She consumed on the voyage 2,877 tons of coal. The Cunarder Scotia, the last of the ocean side-wheelers, came over in 1860, and she made the trip in 8 days, 7 hours, 30 minutes.

When in 1865, the Inman Line put on its second city of New York, and soon afterward the City of Paris, the real ocean racing began. The two Inman liners were classed against the Cunarders Scotia and Russia, which became known as "Atlantic greyhounds." The Inman liner earned the title of "Queen of the Seas" when the City of Paris lowered the record to 8 days, 4 hours, 15 minutes. The White Star liner Britannic made her maiden voyage in 1874, and the Germanic a year later. These vessels promptly showed their sterns to everything afloat, the Britannic making the westward voyage in 7 days, 10 hours and 53 minutes, and the eastward in 7 days, 12 hours, 41 minutes. But the struggle for supremacy still went on, and soon the White Star Line took a back seat, giving way to the Guion Line. This was in 1879, when the sensation of the time, the Arizona, of 6,000 horse power, flew across the ocean in 7 days, 7 hours and 23 minutes, off which record the vessel quickly clipped a couple of hours.

The Alaska followed the Arizona, and it was the Alaska that first made the passage in less than one week. The third great ship brought out by the Guions was the Oregon, whose record was 6 days, 9 hours, 42 minutes. The America, of the National Line, later beat this time by 2 hours and 35 minutes.

With the additions of the Etruria and Umbria, the Cunard Line regained the distinction it had lost years before. In 1886, the Umbria made the westward run in 6 days, 4 hours 12 minutes, and the eastward in 6 days, 2 hours, 32 minutes. The Etruria, two years later, ran to Queenstown in 6 days, 4 hours, 54 minutes, and to New York in 6 days, 1 hour, 47 minutes. The Inmans stepped in again, and with the City of Paris and City of New York challenged the world. In 1889, the City of Paris made a record to Queenstown of 5 days, 22 hours, 50 minutes, while the westward run she reduced to 5 days, 19 hours, 18 minutes. The year following, the Teutonic appeared on the White Star route, and the westward time was lowered to 5 days, 19 hours, 5 minutes. Later, she still further lowered this record to 5 days, 16 hours, 3 minutes. The City of Paris came to the front again in 1892, and became "Queen of the Seas" with a record of 5 days, 15 hours, 58 minutes.

After this came the remarkable performances of the Campania, the Fuerst Bismarck, the Lucania, the New York, the St. Paul, the St. Louis and the Kaiser Wilhelm der Grosse, which today holds the westward record of 5 days, 20 hours, and the eastward record of 5 days, 15 hours, 10 minutes.

The "Illustrated Index," also known as catalogue No. 51, published by the Watson-Stillman Co., New York, shows illustrations of a large variety of tools manufactured by that firm. Each illustration, representing from one to about twenty-six different sizes of tools, is given an index number, and upon application the Watson-Stillman Co. will send complete descriptions, which are kept in the form of loose sheets for distribution as desired. This plan obviates the necessity of sending out the large catalogue which would be required to give particulars of all lines of tools manufactured by the company.

COPPER INDUSTRY OF THE LAKES.

EFFECT OF THE BOOM ON IRON MINING—GREAT VALUE OF THE COPPER PROPERTIES—THE DIVIDEND PAYERS.

It is understood that full 11,000 men were working in and around the copper mines of Lake Superior when navigation closed, a few weeks ago. In 1893 not more than 5,000 men were engaged and in 1897 not more than 9,000. The boom in the copper industry, with prospecting operations going on in various new fields, was the first cause of a scarcity of labor and advanced wages in the iron mines. Although miners in the copper region were paid higher wages than prevail in any of the other mining fields, there has been great difficulty all through the year in securing men sufficient for development work induced by activity in the copper industry. The value of lake copper product during 1898 exceeds \$18,000,000, of which owing to the high prices obtained for the metal, not far from \$8,000,000 is profit to the mines.

Copper mines of the lake country are valued at about \$105,000,000, which is more than 2½ times their worth in 1893, and more than twice their value in 1895. One mine alone, the famous Calumet & Hecla, to which more than to any others the note of this region in the public eye is due, has risen in market value from \$100 to about \$600. Even at \$600 a share this stock, whose par value is \$25, is a good investment, for it is paying 200 per cent a year on its capitalization of \$2,500,000. This year it has paid \$4,000,000. The value of these lake mines and new prospects, based on recent quotations of the Boston Exchange, is as follows:

Mines.	Par value.	Selling value.
Allouez	\$2,000,000	\$240,000
Arcadian	2,500,000	2,700,000
Arnold	1,000,000	750,000
Ashbed	1,000,000	125,000
Atlantic	1,000,000	1,250,000
Baltic	2,500,000	1,800,000
Calumet and Hecla	2,500,000	59,000,000
Centennial	2,000,000	1,600,000
Franklin	1,000,000	600,000
Humboldt	1,000,000	200,000
Isle Royale	2,500,000	2,500,000
Osceola	2,500,000	6,750,000
Quincy	2,500,000	12,500,000
Tamarack	1,500,000	9,000,000
Tecumseh	1,000,000	100,000
Wolverine	1,500,000	1,650,000

To those must be added such properties as the Adventure, Meadow, Mohawk, Winona, old Minnesota (now the Michigan), and some others in process of re-organization, etc., which make the total selling value of these properties, whose par value is \$33,000,000, about \$104,765,000.

The present dividend payers among these mines—this list not including a number of properties that paid dividends a number of years ago and have since been abandoned, and whose total dividends amounted to not far from \$10,000,000—are as follows:

Mines.	1898 dividends.	Total dividends.
Atlantic	\$40,000	\$780,000
Calumet and Hecla	4,000,000	54,850,000
Franklin .....	.....	1,240,000
Kearsage .....	.....	160,000
Osceola	50,000	2,272,500
Quincy	650,000	10,120,000
Tamarack	200,000	5,330,000
Wolverine	60,000	60,000
Totals	\$5,000,000	\$74,812,500

In his recently submitted report Robert P. Porter, the commissioner sent to Cuba and Porto Rico to investigate existing conditions, has the following to say regarding navigation. "Considerable testimony has been taken on the important subject of navigation. The questions arising under this branch of inquiry are delicate and involve, as does the question of discriminating duties in favor of the United States (which many have advocated) in a greater or less degree our international relations with other countries. The material so far gathered under this head has been submitted to the bureau of navigation of the treasury department, and as the experienced and efficient officer at the head of that bureau has now under consideration a plan for facilitating the trade relations between Cuba and the United States, a report at this time on the subject would be inopportune."

Naval Constructor Richard P. Hobson and his recent tactics seem to be coming in for a pretty general denunciation at the hands of the technical press. The Electrical Engineer says: "The sinking of the Merrimac was, of course, an engineering operation, with a little seamanship thrown in. Possibly if Hobson had been more of a seaman, it might have been more successful." The Marine Journal says: "The Merrimac expedition was carried out so heroically that little thought had been given by the general public to the fact that the heroes accomplished next to nothing of what they set out to do. The temptation to consider this unpleasant feature of an otherwise brilliant achievement is the less because, as things turned out, it was just as well, better, indeed, that the ship channel was left open. Still, failure is failure, and this one is of some importance as regards the future, if not as regards the past."

A visit to the National Capital may be enjoyed without extra cost for fare in going to Philadelphia and New York over Pennsylvania short lines. Tickets to those points via Washington may be obtained at same fares as apply over Pennsylvania direct lines, and will be good for ten days' sojourn at the national capital. For particular information apply to Pennsylvania lines ticket agents or address C. L. Kimball, assistant general passenger agent, Cleveland.

FIRST CONTRACTS OF THE NEW YEAR.

The tugboat being built at Charles Hillman & Sons' Ship and Engine Building Works, Philadelphia, for the American Gold Dredging Co., has been named the Nellie Gazzam. The hull is of steel, 65 feet in length, with 14 feet 6 inches beam and 6 feet 9 inches depth of hold. The engine is of the compound type, 9 and 18 inches diameter of cylinders by 12 inches stroke. The other vessel for the same company, also nearing completion, is a dredge, to be used on the rivers of South America. The hull is 90 feet long, 38 feet wide and 7 feet deep. The Marion Dredging Co. will put in the dredging apparatus when the boat is finished.

The P. Dougherty Co. of Baltimore, Md., has contracted with P. Diver & Co. of Elkton, Md., for two barges, each 175 feet long, 24 feet beam and 12 feet deep. The company has also let the contract for a tug to Thomas McCosker & Co. of Baltimore. She will be 90 feet over all, 21 feet beam and 10 feet deep.

It is now stated that the Toledo & Ann Arbor Railway Co. will certainly award to the Craig Ship Building Co. of Toledo a contract for a steel tug to be used in maintaining an open channel between Menominee, Mich., and Death's Door. The vessel will go into commission next fall.

A rumor which has not as yet been verified is to the effect that the Merchants & Miners' Transportation Co. is likely to award to the Harlan & Hollingsworth Co. of Wilmington, Del., a contract for three more steamers in addition to those building.

George R. Warden, director of public works, Cleveland, is receiving bids for constructing pile and timber docks, protecting the south abutment of the Main street bridge, removing the old docks and dredging the Cuyahoga river.

The Neafie & Levy Ship & Engine Building Co. of Philadelphia has launched the sea-going tug Waban, building for M. Revel, of Charleston, S. C. She is 100 feet long, 20 feet beam and 10 feet 6 inches depth.

The new ferryboat for the Port Richmond & Bergen Point Ferry Co., now building at the yards of the Pussy & Jones Co., Wilmington, Del., is to be named the B. M. Shanley.

Capt. George A. Tunnel of Philadelphia has contracted with Sawyer Bros. of Millbridge, Me., for a four-masted schooner, 225 feet in length, 41 feet beam and 17½ feet depth of hold.

Maj. Clinton B. Sears, United States engineer at Duluth, has invited bids for constructing 8,000 feet of revetments and 1,750,000 cubic yards of dredging at Houghton, Mich.

Capt. J. C. Warren, United States engineer at Milwaukee, has asked for bids for furnishing boilers and machinery for six steam fog signals.

Burger & Burger of Manitowoc, Wis., have practically completed the tug Alphonse, building for Peter Schroeder of Two Rivers, Wis.

The new ferryboat building at the ship yard of William McKie at East Boston, Mass., is nearing completion.

Irving Mains of South Casco, Me., will build a small steamer during the winter.

Peter Benham of Sodus, N. Y., is building a steam yacht.

BRITISH GUNBOAT FOR RIVER SERVICE.

There has been no little speculation among naval architects in Great Britain and on the continent with reference to the value of some of the new features incorporated in the gunboat Dwarf, building at the yard of the London & Glasgow Engineering & Ship Building Co. at Govan, Scotland. The innovations introduced have been designed to meet requirements consequent to the employment of the vessel for river service in the eastern possessions of Great Britain. The Dwarf is a shallow-draught twin-screw wood-sheathed steel gunboat, having a length between perpendiculars of 180 feet, length over all 187 feet 6 inches, breadth over sheathing 33 feet. When loaded she will draw 8 feet and have a displacement of 700 tons. The upper and lower decks are completely plated with steel and made water-tight and all the openings have water-tight covers. The upper deck is sheathed with teak and the lower with Dantzie deals. The space below the lower deck is wholly occupied by the magazines, shell-rooms, gunners' stores, electric store, commander's and warrant officers' stores, etc., each space being a separate water-tight compartment. Between the lower and upper decks, forward and aft of the machinery casings, are the quarters respectively for the crew, petty officers, chief officers and commander. Owing to the fact that the vessel

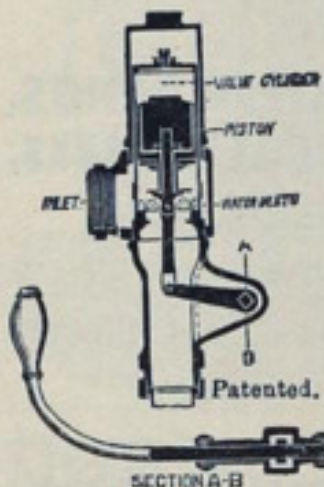
is to be employed mostly in hot climates, everything has been done to ensure a good supply of fresh air by means of skylights, fans, windsails, ventilators, etc., and the wood sheathing on the outside of the ship has been carried right to the upper deck, further to protect the officers and men from the effects of the sun on the bare plating. The stern of the vessel has rather a novel appearance, the breadth of the deck being carried well aft, and the lower part of the hull has been arched on each side in the wake of the propellers, thus giving as much deck space on the lower deck as on the upper. The stem, stern frame, rudder and propeller brackets are all of phosphor bronze; in fact, the fittings are all similar to what is put in the large cruisers. The engines and boilers for propulsions are of the "express" type for moderate powers, and consist of two sets of triple-expansion three-crank engines and two water-tube boilers. The diameters of the cylinders are 11, 17 and 27 inches, by 16 inches stroke. The boilers, which are by the builders, are of the Yarrow type, built for a working pressure of 250 pounds, reduced to 215 pounds at the engines. The heating surface is 4000 square feet and the grate surface 80 square feet. The boilers have been made of ample size, so that wood fuel may be used. The Dwarf will be armed with one 4 inch quick-firing gun on the forecastle head and another on a pedestal on the upper deck aft. There will also be two 12-pounder quick-firing guns under the forecastle deck, to fire right ahead. On the broadside there will be two more 12-pounders and six 45-inch Maxims, and the masts are fitted with military tops, in which are mounted four Maxims. The sister gunboat Thistle, also building by the London & Glasgow company, is well forward and will be ready for launching shortly.

Considerable interest has been aroused in the Tropenas Steel Process, especially since its introduction at the ship yard of the Union Iron Works, San Francisco, known everywhere as one of the most progressive ship building concern in the country. The agents, Powell & Colne of Bowling Green building, New York, write the Review that they have at present more applications than they can attend to for the installation of their small steel plants in various parts of the country. At the Union Iron Works steel castings and some ingots have already been made. The Tropenas process has been fully tried in leading engineering works of Europe. It is fully described in an illustrated pamphlet that may be had from the New York agents.

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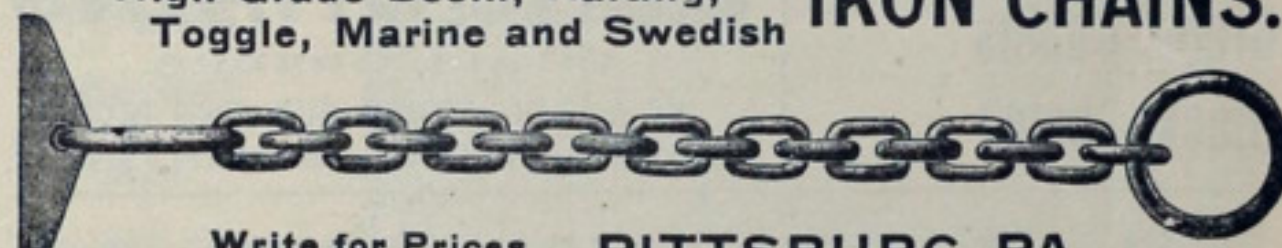
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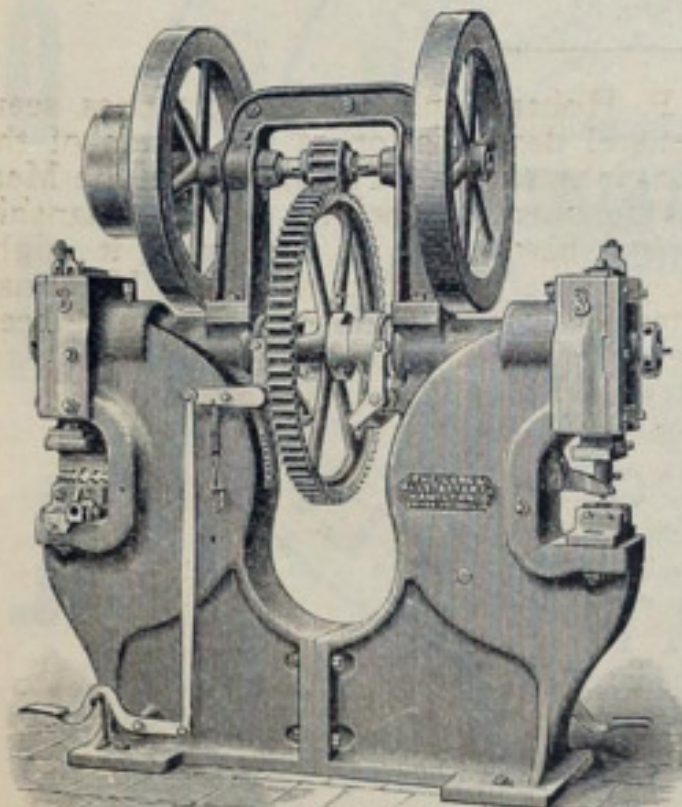
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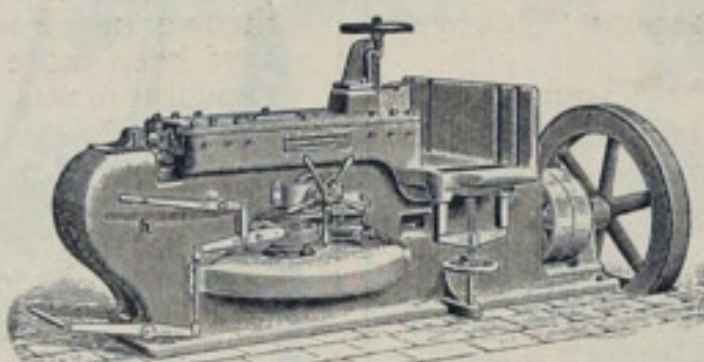
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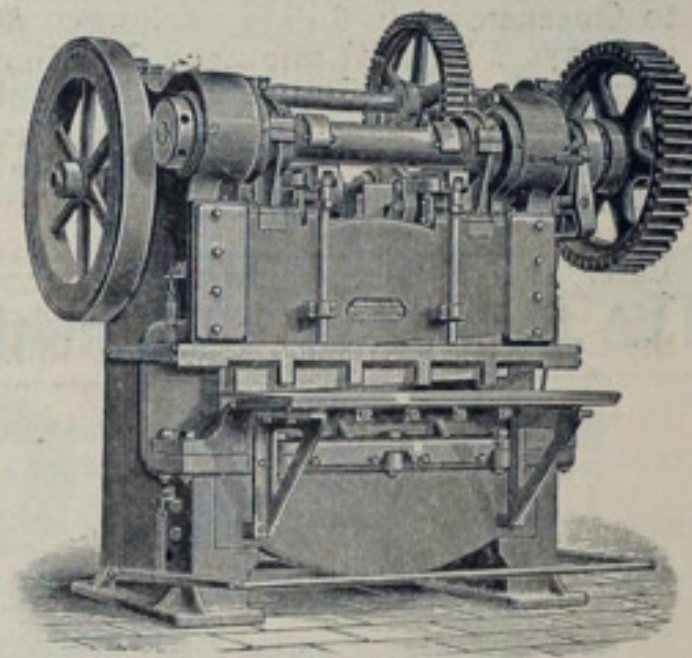
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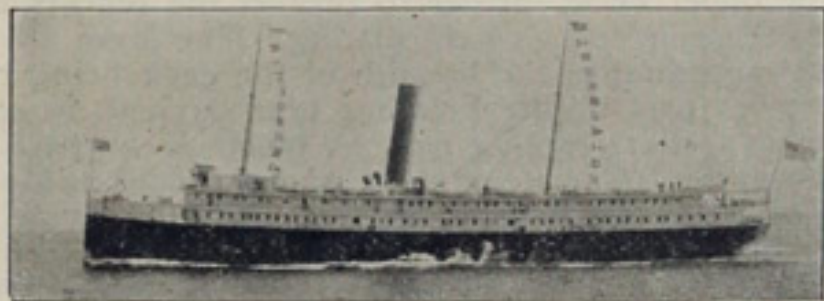
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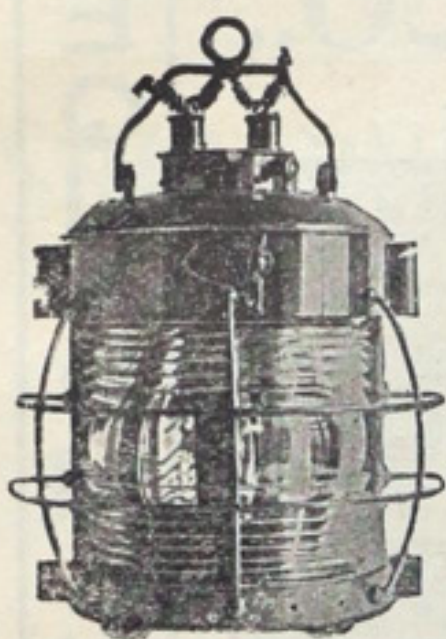


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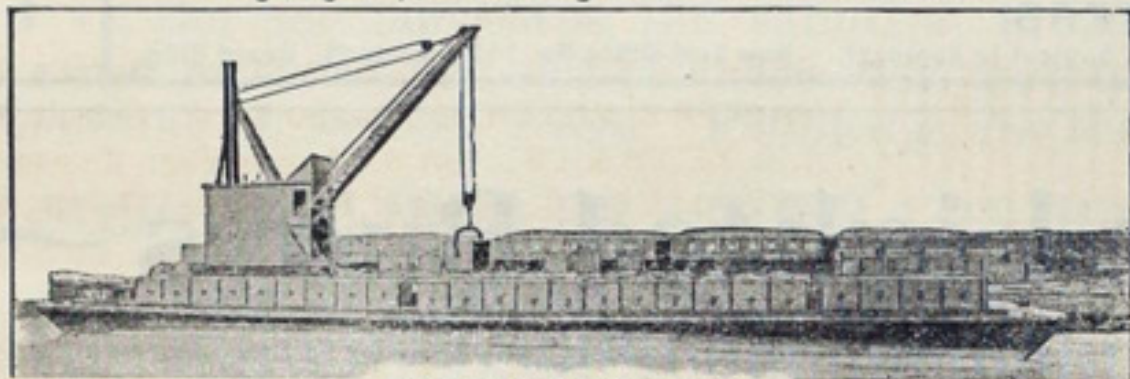
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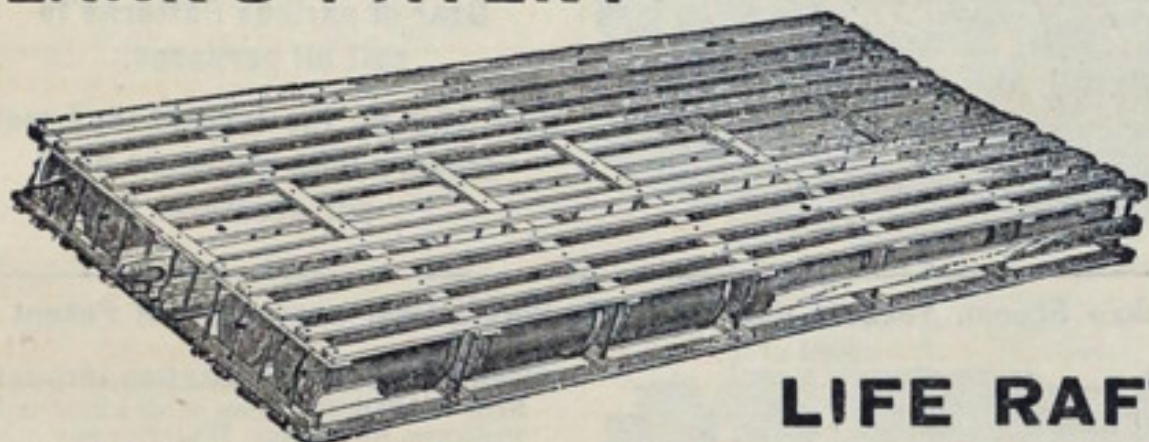
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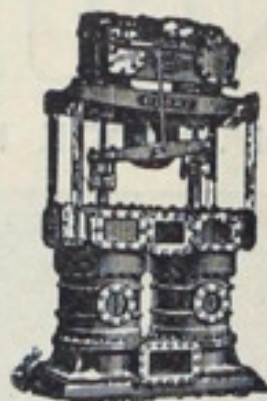
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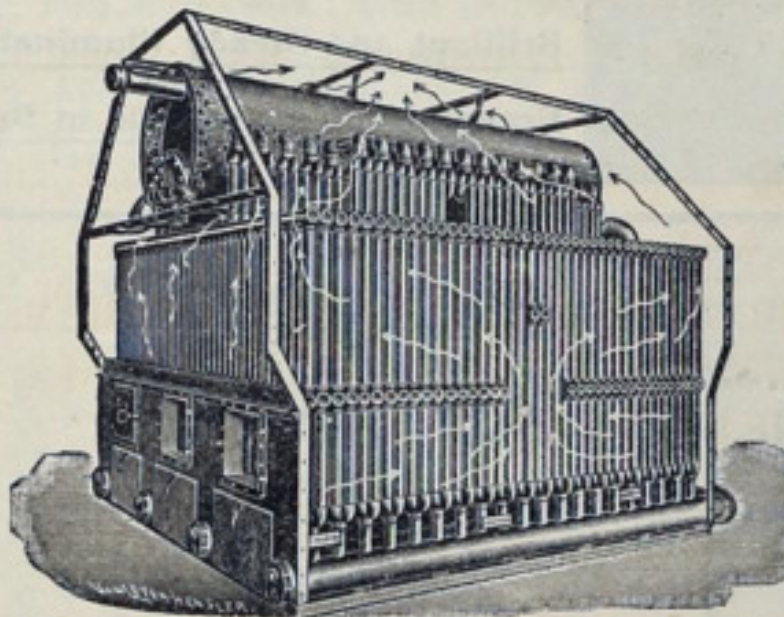
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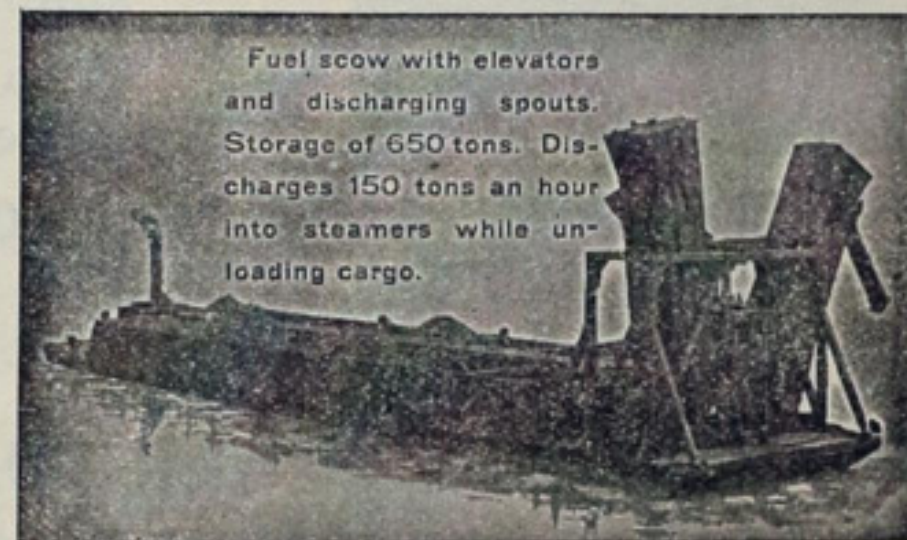
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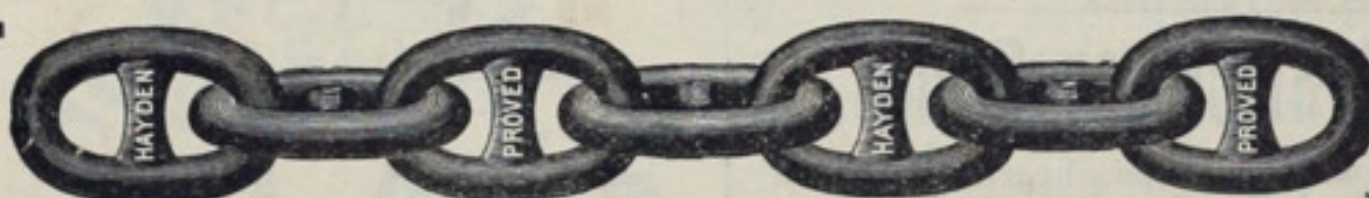
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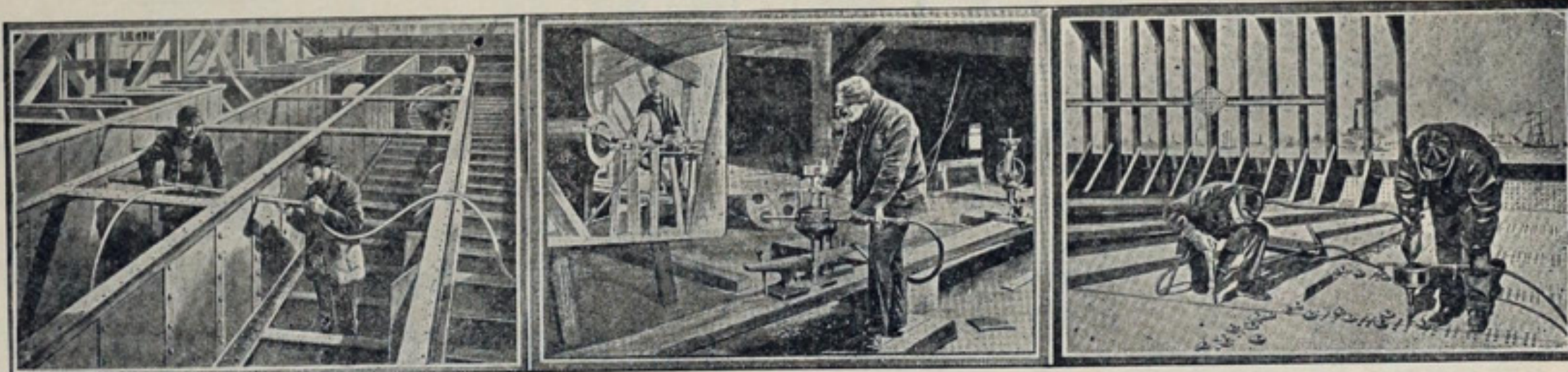


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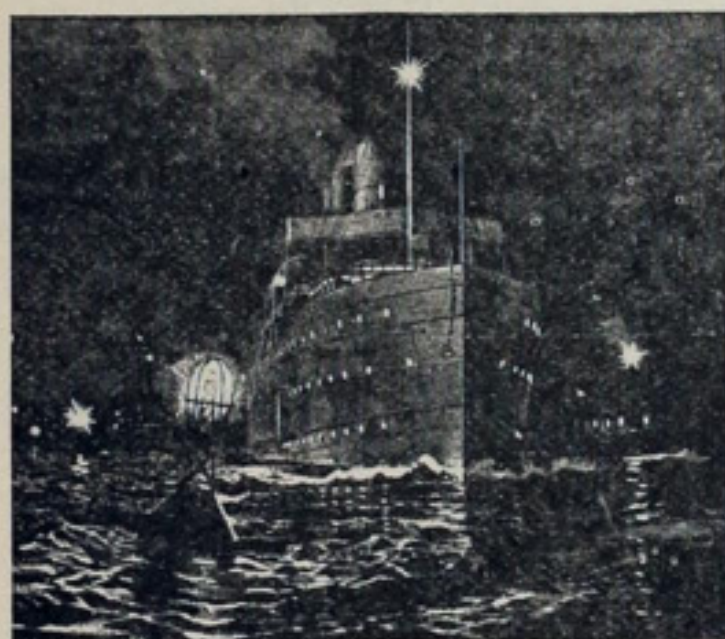
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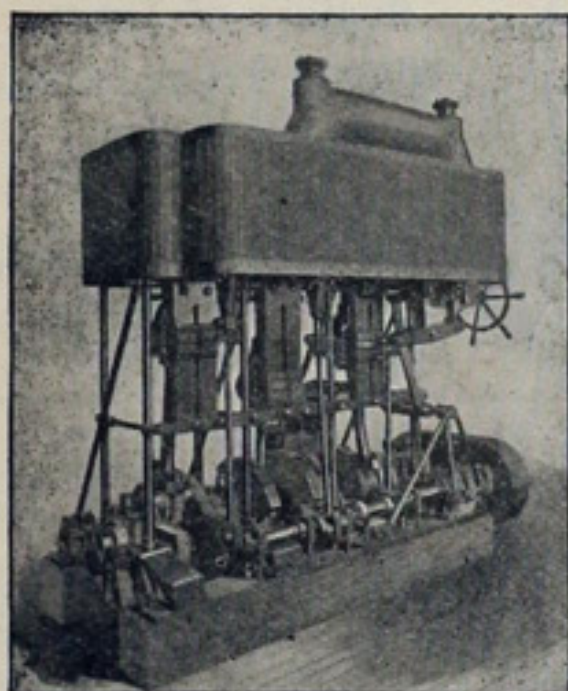
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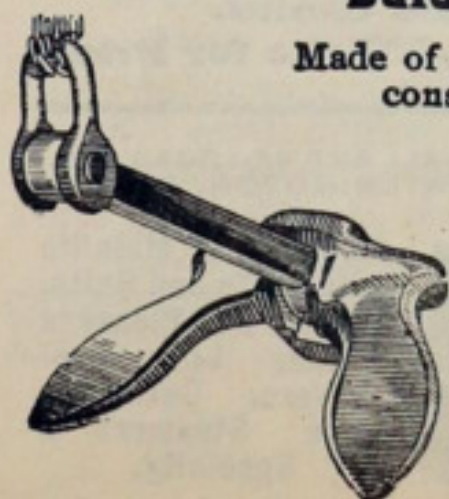
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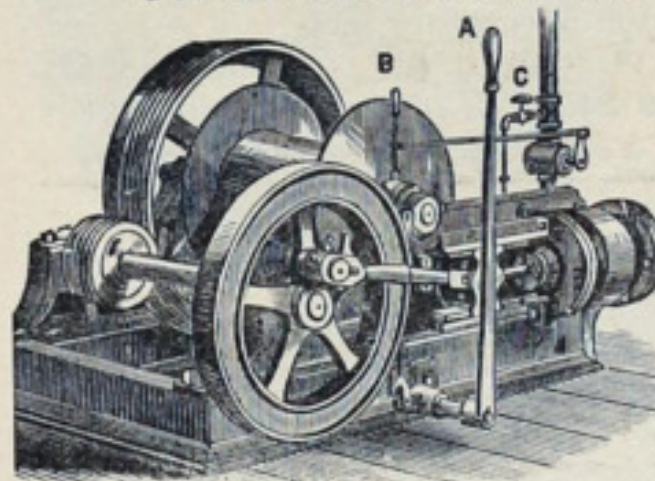
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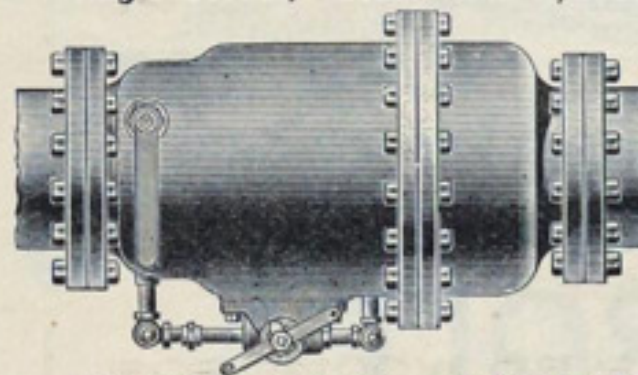


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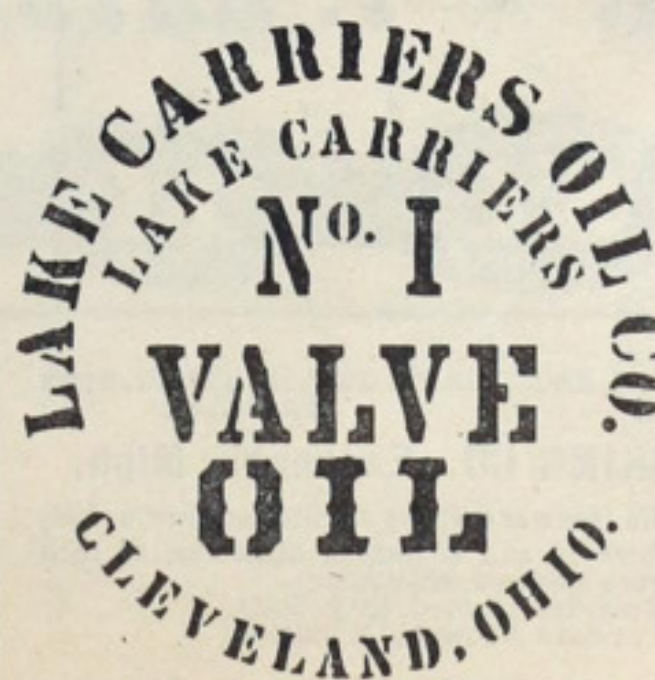
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